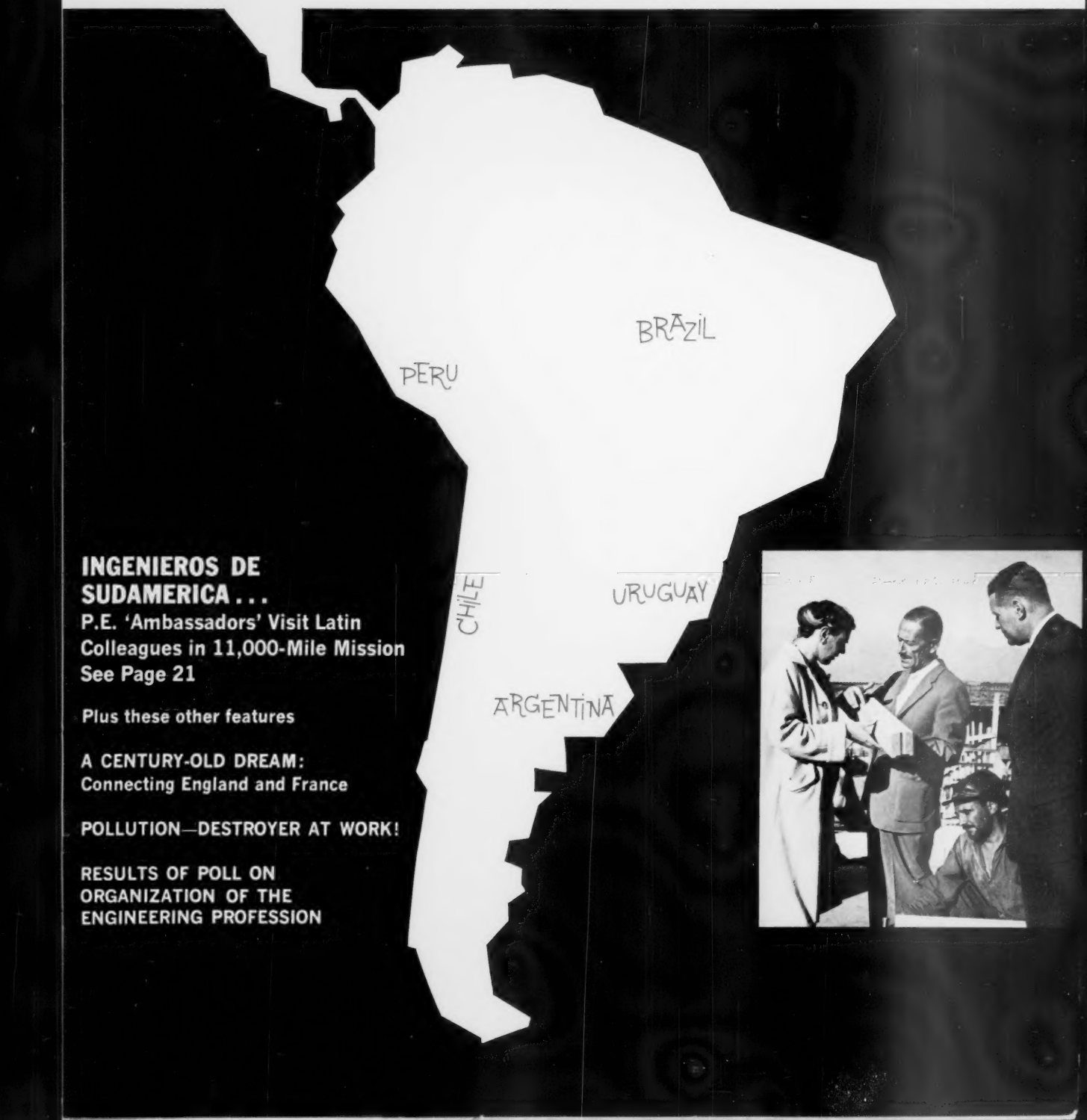
The Magazine of the Registered Professional Engineer

# American Engineer

JUNE 1960




## INGENIEROS DE SUDAMERICA . . .

**P.E. 'Ambassadors' Visit Latin Colleagues in 11,000-Mile Mission**

See Page 21

Plus these other features

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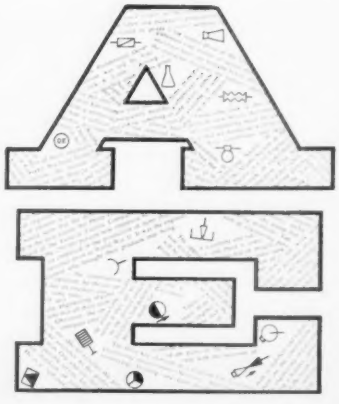

# American Engineer

JUNE 1960
Vol. 30, No. 6

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# Letters to the Editor

### Suggests a Guild . . .

Dear Editor:

A hearty "amen" to Engineer John R. Davis' letter printed in the May, 1960, issue.

While it is not quite true that the American Medical Association sets fees, it does very vigorously police the profession as do the various bar associations. The engineering profession is in sad need of an organization with equivalent powers. I don't believe that unionization on the same basis as the craft unions is the answer either. Instead, I recommend something along the lines of one of the medieval guilds.

In Mark Twain's *Life on the Mississippi*, a more recent guild is described. This was the organization of river pilots, all of whom worked for someone (rather than as self-employed). Their guild, somewhat like the Air Line Pilots Association of today, set minimum wages, not maximums or standards. The power of the river pilots' group lay in the fact that they could attract members in the beginning by giving their members advantages that nonmembers could not get. One in particular was a rigidly limited method of keeping all members well-informed on the most recent river conditions.

Once they had sufficient members, they could and did police their own membership. In addition, they made sure that qualified members were available when and where they were needed. In time, every river pilot who considered his profession worth keeping had to join just to keep up with that profession. Each pilot was still free to bargain for his own wages, each pilot had to be good to keep his job; however, all pilots rallied to help one who had been wronged or else saw that one who had wronged was suitably chastised.

If unions are not the answer to promoting professionalism, and I don't think they are, then maybe something with the powers and capabilities of a guild is.

E. Silverman, P.E.
Valley Stream, N.Y.

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### Disagrees . . .

Dear Editor:

. . . Mr. Davis is on the right track but misses the point somewhat. The engineer in industry needs special consideration all right but not on a mass basis. Therefore, since this is impossible, and since special consideration is still warranted, the only way to get it is to win it individually and as independent agents. I have asked the Harvard University law faculty to draw up a model contract for the engineer in industry delineating all the important considerations which require specification between the employer and professional employee. This model contract will spell out everything in order to lend dignity to the engineer as an individual.

G. E. Crandell Burns, P.E.
Concord, Mass.

### Keeping in Touch . . .

Dear Editor:

In the April issue of American Engineer, you carried an article written by an unlisted author entitled "AFL-CIO Conference Maps Engineer Union Plans." This article, I hope, was written by an AFL-CIO representative and was printed verbatim. If this is the case, then I feel there should have been a rebuttal or at least a statement of NSPE's policy regarding unionism and collective bargaining included at the beginning or end of this article.

If this is written by a member of the American Engineer staff then you should take immediate steps to assure NSPE that in the future only those who are in full accord with its policies will be permitted to write articles for its official publication.

In reading this article, I was left with the impression that unionism is inevitable in our profession and that we should resign ourselves to this fact.

I am registered in two states and am practicing my profession in both. There are no laws in either state that require registration for my particular position. I have been a member of NSPE for the past ten years and have been active in local and state affairs in the hope that it is helping to promote engineering as a profession. Professionalism and unionism cannot be combined unless one or the other changes its basic principles. As soon as it becomes apparent that NSPE has become complacent and condones membership in a labor union, I will resign my membership in the organization.

T. R. Fry, P.E.
Centralia, Mo.

► **Editors Note: To implement NSPE's vigorous policy opposing the unionization of professional engineers, it is necessary to have an informed membership. The story, therefore, reported what the AFL-CIO unions have in mind and are planning in order to unionize P.E.'s and technicians. "To be forwarned is to be forearmed."**

### Differs with Rickover . . .

Dear Editor:

Being a P.E. it made me feel very good after reading Admiral Rickover's article and later comments. I didn't

realize how important I was to the welfare of our society. I secretly wish in my heart that he was right. However it is hard for me to believe that my status as P.E. depends on an insulation which shields me yet is permissive to outgoing intelligence.

Admiral Rickover tells us that we must not be dictated to by the hand which is feeding us else we shall be in danger of losing status and prestige. I say that this is a lot of hogwash. As known by almost any engineer in industry who is responsible for operation of his department, he needs and desires direction from his superiors. Successful operation of the engineering department demands not just cooperation with management; it definitely requires inspiration and information from, and loyalty to a higher authority.

If I, as a P.E., am above question or reproach due to my professional status, then so is my doctor. In my opinion the position of the present day doctor or lawyer who hides behind his professional status for protection from criticism represents one of the few retrenchments against democracy.

Admiral Rickover, although admittedly intelligent, appears to me to have a somewhat "Prussian" attitude.

C. E. Freese, P.E.
Erie, Pa.

### Congrats . . .

Dear Editor:

Let me congratulate you on your article on page 16 (Registration case in Maryland—Ed.) of the April, 1960, issue.

It takes intestinal fortitude to print the other fellow's viewpoint, regardless of how repugnant it is to us.

On all matters regarding our Society and matters pertaining thereto, I follow our State board's lead—that is their job.

In this instance I agree with the judge, rules should not be inflexible; we should never become hidebound by tradition. Engineers, of all people, should have an open mind.

The eminence clause (old grandfathers' clause) was set up for such contingencies. The Maryland board may have erred in not using it in this case.

Once again your intelligent handling of this situation is refreshing, and if you are right ninty-nine per cent of the time, to admit someone else can be right the other one per cent strengthens your position.

J. Walter Couture, P.E.
Fulton, N. Y.

### Liked 'Thoughts' . . .

Dear Editor:

The "Thoughts on Professionalism" column in the April issue of AE (Professionalism—Whose Definition?) was excellent.

Keith W. Henderson, P.E.
East Palo Alto, Calif.

### Plaudits . . .

Dear Editor:

I would like to compliment you and the staff on (recent) issues of the American Engineer . . . .

Tom G. Calhoun, P.E.
Dallas, Tex.

### 'Basic English' . . .

Dear Editor:

Those who have the belief or the hope that Interlingua might come to be the best language for use between different nations should keep in mind that there have been, in years gone by, three other such made-up languages (Volapuk, Esperanto, Ido) which did not get very far.

The reason, we would say, why they did not get anywhere, was because nobody sees a good reason for putting in a lot of work on a language if there are not a great number of others who have any knowledge of it.

But there are a great number of persons who have made English their second language.

About 1926, C. K. Ogden put together a system of English that makes use of only 850 words and that is, because of that, very simple to become expert in. Its name is *basic English*. With this system, a person can say anything he has need to say in the normal business of the day.

It is in no sense a "Pidgin English." It may seem not quite the same as normal English but you will have no trouble in getting the sense of it all through this letter, because this letter is in *basic English*.

William F. Saunders, P.E.
St. Louis, Mo.

### Comparing $ $ . . .

Dear Editor:

The April issue of the American Engineer carries the returns from the NSPE Income and Salary Survey. The survey shows average pay between $9,000 and $9,500. On April 6, the Chicago *Daily News* headlined "Rail Pay Lagging" and reported annual pay for railroad locomotive operators ("engineers") to average $9,327. A few days later the Wall Street *Journal* reported on truck drivers and rail "engineers." I did not save the clipping, but remember something about $10,000 to $12,000 being mentioned as the report of a government agency.

I suggest that a very brief review of the above should be printed at the beginning and end of all articles about engineers' unions and about the shortage of engineers.

I further suggest that a news release comparing the figures should be released about now so that students picking college courses could be governed accordingly.

John M. Graham, P.E.
Evanston, Ill.

*(Circle 2 in Readers' Service Dept.)*

# Private Firms to Play Major Role in Space, Says GE Head

Private enterprise will play a major role in the exploration and economic development of space, as it did in opening up frontiers of the past, according to Ralph J. Cordiner, chairman of the board of the General Electric Company.

While most space operations may at first depend primarily on government sponsorship, Mr. Cordiner emphasized that industry should be the contractor for most of the technical work required and space should not be pre-empted for Federal enterprise. He called a "close partnership" between government and private industry to meet the space challenge "inevitable."

"The preponderance of the research and development work and special facilities should at first be financed by government, because of the national interest in establishing United States leadership. But the companies concerned—in their own interests—should also invest in appropriate facilities and manpower to conduct research and development. As an area of space becomes familiar, government-financed research and development should be shifted outward or to other projects of national interest, and private capital should complete the developmental work," he said.

Referring to the current international space race, Mr. Cordiner said that this country can surpass the Soviet Union in any technology it selects, "if it will use, rather than suppress, its basic strength.

"It is my view that national economic and military progress will be faster and more solid, and the freedoms we cherish will be preserved, if competitive private enterprise does just as much of the nation's scientific and technical work as possible—and government provides the legal and policy framework to stimulate outstanding technical performance," he stated.

Pointing out that the space frontier will inevitably increase the scale of thinking and risk-taking by business, Mr. Cordiner said that private enterprise must "step up to the big risks with the same vision and daring that enables an earlier generation of builders to push railroad tracks out across the wilderness to the Pacific, and lay the foundations of our modern economy."

Mr. Cordiner made his remarks in a special lecture delivered as part of the University of California at Los Angeles' current series on "Peacetime Uses of Space."

**Engineering Leaders**

Two prominent engineers discuss at a recent meeting the importance of getting the most out of America's brainpower. Dr. T. Keith Glennan, administrator of the National Aeronautics and Space Administration and president-on-leave of Case Institute of Technology, talks with W. L. Everitt, dean of engineering of the University of Illinois and president of ECPD.

## Standards Association Announces 1960 Listing

The 1960 Price List and Index of American Standards, published by the American Standards Association, lists nearly 1,900 American Standards that have been approved to date.

The fields covered include automotive, chemical, civil engineering and construction, drawings, symbols, abbreviations, electrical engineering, metallurgy, materials handling, mechanical engineering, mining, nuclear photography and motion pictures, paper, petroleum, rubber, textile, wood, safety, gas appliances and some consumer goods.

Also listed are the international standards recommendations of the International Organization for Standardization and the International Electrotechnical Commission.

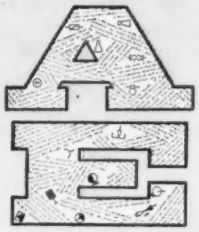
The Price List and Index may be obtained, without charge, by writing to the American Standards Association, Dept. PR 151, 10 East 40th Street, New York 16, N. Y.

## Atlantic City is Site of AIEE Meeting, June 20-24

Atlantic City will be host June 20-24 to the summer general meeting of the American Institute of Electrical Engineers for the first time since 1953. The Philadelphia Section of the Institute is sponsoring the meeting at the Chalfonte-Haddon Hall Hotel.

Sixty-six technical sessions are planned, about half on communications, instrumentation and control, computers, basic science and management and the remainder on aspects of power generation, transmission and distribution.

The annual meeting of the Institute, which will be held the first day of the summer conclave, will be marked by announcement of 1960-61 officers, an address by J. H. Foote, president of AIEE and presentation of the 1959 Lamme Medal to Lee A. Kilgore, manager of engineering at Westinghouse Electric Corporation's East Pittsburgh division.



# "This Month"

America's two touring "Goodwill Ambassadors," both engineers, have returned from South America and all aspects of their trip—tailored for engineers, of course—are reported in this AE beginning on page 21. Here is helpful, objective information about the profession in that sometimes little-known land below.

For years, proposals for crossing the English Channel by bridge or tunnel have been studied by the English and French governments. Today the possibility looms larger that one of these plans will soon go into actual operation. The project, if it is undertaken, will be one of the major engineering jobs in history. In our "Engineer-at-Work" piece for "This Month," we detail some of the plans for the various channel projects and the engineering problems involved. Page 33.

How big of a problem is water pollution? Engineers, conservationists and politicians are taking renewed interest in this long-standing question. A staff report, page 39, surveys the problem and looks into some of the engineering answers and responsibilities to the situation.

The results are in and we now have a much clearer idea of just how the NSPE membership feels about the organization of the profession. The results—based upon questionnaires sent to all NSPE P.E.'s—point more definite paths to unity. Page 43.

And on page 38, Case No. 59-3 is reported upon by the Board of Ethical Review.

Scanning the profession for headlines:

General. Page 6. GE's Cordiner says private firms must play major role in space exploration. Among other news: The American Standards Association announces the release of its new list of nearly 1,900 approved standards.

Consulting. Page 9. The attacks on the use of consultants by the Federal Government continues and NSPE continues to oppose them at top levels. In another news item the Treasury Department submits its own proposal to replace the Keogh-Simpson bill which it has long opposed.

Education. Page 12. The stories: Armco-NSPE scholarship winners are announced . . . a new survey shows "sensational" demand for engineers . . . engineering curricula will get another going over at the University of Michigan in July by leading educators . . . and the NSF has announced $620,000 in educational grants.

Government. Page 14. The headlines: Federal Registration System for P.E.'s Proposed in Bill . . . Kansas Attorney General Rules on Surveying Case . . . Study Group Recommends Special Commerce Office . . . Commission Proposed to Study Manpower Needs . . . CSC Announces Change in Standards . . . Anfuso Introduces Bill to Coordinate Programs.

Industry. Page 18. Professional engineers everywhere were elated last month when their professional colleagues at Western Electric voted against representation by a union that had been their "voice" for a decade. Full report on page 18. In another important union story the Sperry Gyroscope Company has clashed with the independent Engineers Association in its move to affiliate with the International Union of Electrical Workers.

Kenneth E. Trombley

Editor

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*(Circle 3 in Readers' Service Dept.)*

## ASTM to Meet; Materials Sciences Top Program

A searching look into the present state of knowledge of several facets of materials science will highlight the sixty-third annual meeting of the American Society for Testing Materials at Chalfonte - Haddon Hall, Atlantic City, N. J., June 26-July 1. The Society's new Division of Materials Sciences has organized an all-day program for Monday, June 27, consisting of two symposia related to basic materials knowledge: "Symposium on Recent Progress in Materials Sciences" and "Symposium on the Nature and Origin of Strength of Materials."

Dr. W. O. Baker, vice president, research, Bell Telephone Laboratories, will speak Monday noon at the Materials Sciences luncheon on interdisciplinary laboratories and research and education relating to materials sciences.

Close attention also will be given to solar energy, nuclear fuel element development, low temperature properties of high-strength aircraft and missile materials, acoustical fatigue, and radiation effects and radiation dosimetry.

## Witzenburg Elected Head Of Lubrication Engineers

The American Society of Lubrication Engineers has announced the election of L. O. Witzenburg, Cleveland Worm & Gear Division, Eaton Manufacturing Company, Cleveland, Ohio, as president of the 3,000-member technical group. Prior to his election as president, Mr. Witzenburg served as vice president at large and industrial director.

L. O. Witzenburg

Dean M. Cleaveland, Bendix Products Division, Bendix Aviation Corporation, South Bend, Ind., was elected by the board of directors as vice president at large. W. E. Hoch, Viscosity Oil Company, Chicago, Ill., was elected treasurer, and A. E. Cichelli, Bethlehem Steel Corporation, Bethlehem, Pa., was re-elected secretary.

## Meetings of Note

**American Nuclear Society**—Annual Meeting, June 12-14, Palmer House, Chicago, Illinois.

**American Society of Agricultural Engineers**—Annual Meeting, June 12-15, Ohio State University, Columbus, Ohio.

**American Association of Cost Engineers**—Annual Meeting, June 13-15, Houston, Texas.

**American Society of Heating, Refrigerating and Air-Conditioning Engineers**—Annual Meeting, June 13-15, Vancouver Hotel, Vancouver, British Columbia.

**American Institute of Electrical Engineers**—Summer General Meeting, June 20-24, Chalfonte-Haddon Hall, Atlantic City, New Jersey.

**American Society for Engineering Education**—Annual Meeting, June 20-24, Purdue University, Lafayette, Indiana.

**American Society for Testing Materials**—Annual Meeting, June 26-July 1, Chalfonte-Haddon Hall, Atlantic City, New Jersey.

**Institute of the Aeronautical Sciences**—National Summer Meeting, June 27-30, Ambassador Hotel, Los Angeles, California.

**National Association of Power Engineers** — Annual Convention, June 27-30, Jack Tar Hotel, San Francisco, California.

## Dams Highlighted on National ASCE Meeting

Joint sessions with the United States Committee on Large Dams feature the program of the national convention of the American Society of Civil Engineers to be held at Reno, Nevada, June 20-24.

More than 100 papers, sponsored by eleven of ASCE's technical divisions, will be presented during the five-day convention. Registration is expected to exceed 1,000.

The U. S. Committee on Large Dams is the American segment of the International Congress on Large Dams, in which forty-four nations of the world participate. It will hold joint sessions with ASCE's construction, power, hydraulics and soil mechanics & foundations divisions, and will combine with the power division in a field trip to the Upper American River project.

Together with the emphasis on problems related to dams, engineering aspects of other water matters will occupy considerable attention at the meetings. Both the waterways & harbors and the irrigation & drainage divisions will each sponsor four sessions, at which a total of twenty-seven papers will be presented.

## 50th Anniversary for Engineering Firm

J. Gerald Phelan, president of Fletcher-Thompson, Inc., cuts the 50th anniversary cake of the architectural and engineering company luncheon held recently at the Starlight Roof of the Waldorf-Astoria. Looking on is Bob Considine, Hearst columnist who was guest speaker. More than 500 guests attended the tribute.

# Attacks on Consultants Prompt Vigorous Protests

NSPE has registered a vigorous protest against recent GAO charges that states have been using consulting engineers on Federal-aid highways in violation of law and Department of Commerce regulations.

Speaking before the Thomas Subcommittee on Independent Offices, Comptroller General Joseph Campbell had stated that the use of consulting engineers on the Federal-aid highways had ". . . substantially and unnecessarily increased the cost of that engineering. . . ," and had implied that the Federal Government should not foot the bill for engineering services even though Federal funding would be cheaper to the taxpayer in the long run. NSPE Executive Director Paul H. Robbins urged members of the House Appropriations Subcommittee to consider the total costs to the taxpayer rather than just the cost to the Federal Government, and gave a point-by-point criticism of GAO allegations.

In directing the congressmen's attention to the just-published NSPE survey report, *The Role of the Consulting Engineer in Federal Public Works Projects,* Mr. Robbins pointed out that the comprehensive study clearly refutes the assumption that it is always cheaper to use state employees rather than private consultants. "It is unfortunate," he said, "that the statements and series of arguments presented (by the Comptroller General) are all based upon an assumption which has no basis in fact, but is just 'assumed' to be true. We believe the . . . survey report clearly shows the opposite situation to be true with regard to highway design and other types of design for the various Federal agencies."

"American engineers quizzing each other for information—asking 'What do you know, Joe?'"

The NSPE executive director went on to deal with the GAO's charges that the states' use of consulting engineers violates the Federal-aid Highway Act and Department of Commerce regulations. Mr. Robbins quoted the Federal-aid Highway Act which says nothing about the use of consultants, but merely provides that state highway departments . . . "shall have adequate powers, and be suitably equipped and organized to discharge to the satisfaction of the Secretary (of Commerce) the duties required by (the Highway Act)." What it takes to incur "the satisfaction of the Secretary," is defined in Department of Commerce regulations which clearly allow the use of consulting engineers when "the State has a program substantially larger than normal or expected in future years and it desires to employ consulting engineers rather than build up its organization for a comparatively short period." Mr. Robbins stated that "it seems obvious that (this provision) is intended to and does cover the very situation which now exists—the existence of an extensive program beyond the normal scope and contemplation of that which might be efficiently and economically handled by a state highway department design staff."

The Congressmen were urged to steer clear of the type thinking which holds that engineering somehow "costs" less if the Federal Government does not pay for it, "but rather will agree with us that the proper basis of analysis should be the total cost to the taxpaying public without regard to whether the source of funds is through Federal taxes or state taxes."

## Treasury Dept. Submits New Retirement Proposal

The Treasury Department, which has long opposed the Keogh-Simpson bill because of possible revenue losses, has submitted its own proposal for a self-employed retirement bill to the Senate Finance Committee.

According to the Treasury Department, the Keogh-Simpson bill (H.R. 10) would result in an immediate revenue loss of $365 million per year and would set a precedent which could conceivably result in annual tax losses amounting to $3 billion.

In a twelve-page letter to Senator Harry F. Byrd, chairman of the Senate Finance Committee, the Treasury has proposed an alternative plan whereby self-employed individuals would be allowed to set up their own retirement programs only if they also cover their employees. In essence, the Treas-

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*(Circle 4 in Readers' Service Dept.)*

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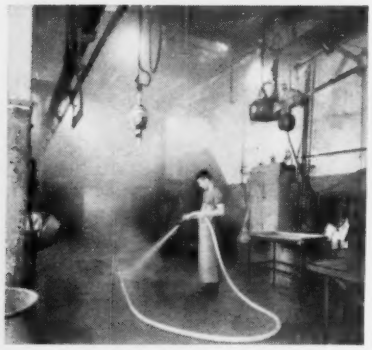

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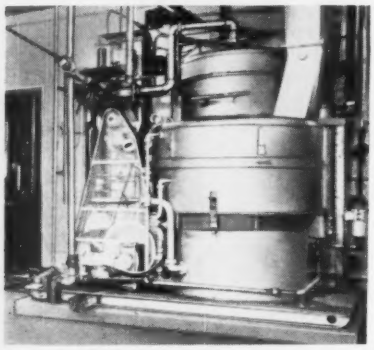

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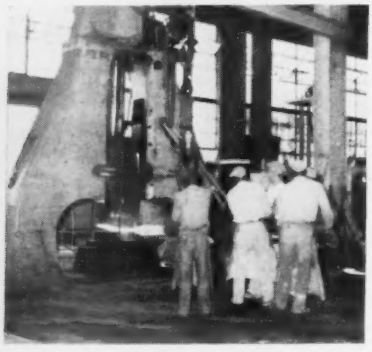

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*(Circle 5 in Readers' Service Dept.)*


ury plan would consider self-employed individuals under the same rules now covering corporate retirement programs, and would allow self-employed persons to consider themselves as employees for tax purposes.

The detailed Treasury proposal indicated a number of alternative methods for handling contributions of the self-employed. In general, the various plans would permit the self-employed to set aside ten per cent of income from personal services, with a limit of $2,500, but this could be exceeded in some cases if the employees received higher benefits under a nondiscriminatory plan. As in current regulations applying to corporate pension plans, a nondiscriminatory plan would prohibit the self-employed proprietor from basing his own contribution on a higher percentage than that provided for his employees. However, the Treasury letter does indicate that there may be some reasonable limitations, such as minimum years of employment before coverage and integration of benefits under the social security system in computing the retirement funds for employees.

A major practical and political problem in the Treasury approach is an attempt to tie the legislation to the Treasury's desire to amend the corporation pension statute to limit benefits to owner-managers. The limitation sought by the Treasury would provide that no more than thirty per cent of the total employer contributions could be used to finance benefits for stockholder-employees who own more than ten per cent of the voting stock of the corporation. The Treasury argues that the corporate cutback would result in a tax-income gain to offset some of the loss in income resulting from the extension of pension benefits to the self-employed. An annual revenue loss of $150-$250 million is indicated under the restricted plan, but Treasury adds that this loss would be partially offset by the corporate cutback provision.

The Treasury further stressed that in any legislation, first priority should be given to future budgetary requirements and the necessity of substantial debt reduction in fiscal 1961 and subsequent years.

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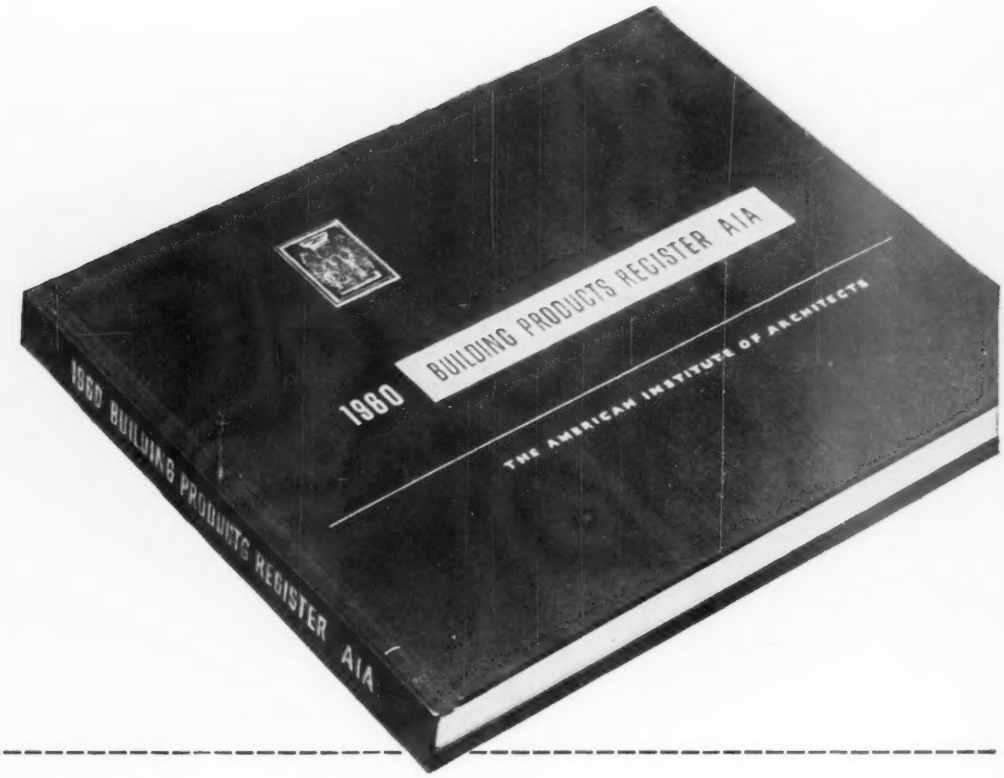


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# Armco-NSPE Scholarships Go To Five High School Seniors

Four-year civil engineering scholarships have been awarded to five high school seniors in a nation-wide scholarship selection program sponsored by the Armco Foundation, in cooperation with the National Society.

The $3,000 scholarships were awarded by a selection committee made up of professional engineers holding membership in NSPE, and representatives of the Armco Drainage & Metal Products, Inc., a subsidiary of the Armco Steel Corporation. The awards were granted on the basis of the students' scholastic records and aptitudes for engineering.

The Armco-NSPE scholarships were awarded for the first time in 1959. Selection of scholarship candidates and final awards will be continued each year as part of the Armco-NSPE program for developing the nation's engineering resources. Public, private, or parochial school applicants for the scholarships must rank in the upper one-fourth of their high school classes and plan to study civil engineering.

The five scholarship winners for 1960 are:

Leroy E. Baker, Omaha, Nebraska; Gary R. Bourne, Cashmere, Washington; Thomas F. Ward, Poland, New York; Peteris A. Porietis, Marion, Ohio; and Philip J. Stockhausen, Ormond Beach, Florida.

Each scholarship winner will receive $750 per year. The scholarship will be renewed annually for four years providing the student meets satisfactory personal and scholastic standards as determined by the college in which he is enrolled. The winners may attend any college or university which is accredited by the Engineers' Council for Professional Development.

Privately endowed schools in which scholarship winners are enrolled will receive an unrestricted grant of $500 annually from the Armco Foundation. This grant is a cost-of-education allowance paid each year the scholarship is in force. Tax-supported colleges will receive a yearly allowance of $100.

The Armco Foundation was established by Armco Steel Corporation for educational and charitable purposes. Armco Steel is the sixth largest steel producer in the U.S.

(Photographs of the five high school seniors are shown on page 13.)

## 'Sensational' Demand for Engineers, Survey Shows

As usual, demand for and salaries offered June engineering graduates have substantially exceeded pre-hiring season estimates, say latest placement office reports. While the job market for nontechnical graduates is "adequate but unspectacular," engineering and scientific graduates are reaping the benefits of a "sensational" demand, says *Business Week's* annual survey of university placement officers and company personnel men throughout the country.

At the University of Michigan, where salary offers had previously been expected to increase by about 1.8 per cent over 1959, the engineering placement office now reports a jump of five per cent over last year. Bachelor degree holders are getting offers averaging $535, as compared to $508 of last year.

**Armco-NSPE Scholarship Committee**

Members of the Armco-NSPE Scholarship Committee are, l.-r.: D. H. Pletta, head, Department of Engineering Mechanics, Virginia Polytechnic Institute; W. H. Spindler, supervisor, Armco Drainage & Metal Products, Inc., programs, Market Development Division, Armco Steel Corporation; Chairman L. S. Hobson, Engineering Experimental Station, Kansas State University; R. F. Crawford, manager, Educational Relations, Armco Steel Corporation, and R. A. Freese, manager, Building Sales, Central Division, Armco Drainage & Metal Products, Inc.

## Here are the Scholarship Winners

These five youths have been named recipients of Armco-NSPE scholarships (see story, opposite page). They are, l.-r.: Gary R. Bourne, Thomas F. Ward, Philip J. Stockhausen, Leroy E. Baker, and Peteris A. Porietis.

and for master degrees, salaries are up from $601 to $621.

Increasing activity in the missile field has caused relatively less interest in UM aeronautical engineers, with greatest demand being for electrical engineers, whose salary offers are averaging $547.

In spite of the tremendous demand, the *Business Week* survey reports that companies are still choosy. Increasing emphasis is being put on graduate degrees, and many research and development firms will not even consider students not in the top third or quarter of their classes.

### Engineering Curricula to Be Studied by Educators

Engineering educators from all parts of the United States will gather at the University of Michigan at Ann Arbor on July 6-8 for what has been described as a vital conference on civil engineering education curricula.

Deans and the heads of departments of engineering in 138 colleges, universities and institutions with curricula in civil engineering accredited by the Engineers' Council for Professional Development have been invited to attend the conference on an expense-paid basis. More than 100 other engineering educators are expected to attend.

The conference is being financed by a grant from the National Science Foundation. Last December, Cooper Union, of New York, an institution for the Advancement of Science and Art, received a grant of $43,410 from the National Science Foundation to support a projected study of the scope and content of under-graduate curricula in civil engineering.

The project was co-sponsored by the American Society of Civil Engineers and the American Society for Engineering Education.

### NSF to Again Sponsor Many Education Projects

The National Science Foundation will in 1960-61 again sponsor science education projects for students and teachers, through grants to state academies of science and similar organizations. The forty-three grants, to thirty-six institutions, total $620,000.

A wide variety of projects will be undertaken, including expansion of junior academies of science, visits to secondary schools by scientists, and experimental approaches to science education. Illustrative of this variety are some of those carried on during 1959-60, the first year of the program:

- The Indiana Academy of Science sponsored a series of 250 visits by competent scientists and mathematicians from 19 Indiana colleges and universities to secondary schools.
- The Louisiana Academy of Science conducted a Junior Academy of Science Program in which secondary school students did research projects and wrote papers describing their results for presentation at ten regional meetings. The best papers were presented and judged at a state meeting.
- The Texas Academy of Science sponsored two-day conferences on research at four Texas universities, which were attended by 400 undergraduates from colleges not offering the Ph.D.

Support by NSF includes items such as expenses of high school science teachers to attend meetings; cost of expendable supplies, expenses of lecturers or visiting scientists, and necessary administrative expenses.

*(Circle 7 in Readers' Service Dept.)*

# Federal Registration System For P. E.'s Proposed in Bill

Representative John R. Foley of Maryland has introduced a bill to regulate the practice of engineering on Federal projects or projects sponsored by the Federal Government through the establishment of a system for the Federal registration of professional engineers, scientists and technicians. The bill provides that no person can engage in the practice of engineering, scientific pursuit or technical endeavor on Federal projects or Federal sponsored projects unless he submits evidence of qualification and becomes registered under the proposed Act.

A Federal Board of Registration for Federal Professional Engineers, Scientists and Technicians would be created to administer the program. The board would consist of seven members who have been engaged in the practice of engineering for twelve or more years, and who, for the past three years, have been employed by the Government. Appointments to the board would be made by the executive branch of the Government from a list of eligibles submitted by Congress.

A person could become registered as a professional Federal engineer without examination if: (1) he holds a state license; or (2) he holds a certificate issued by the National Bureau of Engineering Registration; or (3) he has been engaged in the practice of engineering for twelve or more years, or (4) he has been engaged in the practice of engineering for the Federal Government prior to the Act and submits his application within one year after the date of enactment. Examinations are provided for under other conditions.

The Foley bill also prescribes rules for the registration of professional Federal scientists, Federal technicians and engineers-in-training.

The term, "practice of engineering," is defined in the bill as:

> the practice of those branches of engineering, the pursuit of any of which affects the safety of life, health or property, the public welfare, raises the standard of living, or improves any item used or needed by the Federal Government. Said practice includes the doing of such architectural work as is incidental to the practice of engineering.

Because the bill refers to any person engaged in the practice of engineering on "Federal projects or Federal sponsored projects," it appears that the proposed Federal Registration Act would apply to nongovernmental as well as governmental engineers. However, the purposes of the registration system, as indicated in the bill, would be to improve the Government's competitive position in the recruitment and retention of engineering personnel, offer incentives for such personnel in the form of personal recognition and prestige, enhance the Government's position when its employees are attending contract negotiations and encourage students to enroll in and pursue courses leading to degrees in engineering and science.

Rep. Foley introduced the bill "by request," which sometimes means that the sponsor is accommodating some party or group and that he does not necessarily support or endorse the proposal. (H.R. 11916)

## Kansas Attorney General Rules on Surveying Case

A county surveyor cannot contract with the county to perform surveying and engineering services and be paid for such services in addition to his regular salary, the Kansas Attorney General has ruled.

The opinion declared that Kansas statutes clearly define the qualifications, duties and salary of the county surveyor, and that where a county officer's salary and duties are prescribed by law, he is precluded from receiving any extra compensation for performing his statutory duties unless the statute contemplated and intended additional compensation. The Attorney General added that since the statute does not appear to authorize the county surveyor to receive any extra compensation for performing his statutory duties, it thus may be inferred that the salary authorized therein was to be compensation for all surveying services performed for the county.

"We must conclude that the board of county commissioners could not employ the county surveyor and pay him extra compensation to perform work which they could compel him to do as part of the services he must render for his regular salary," the opinion said. "We likewise are of the opinion that the county commissioners could not hire a partner of the county surveyor and pay such partner for the making of plans, specifications and other estimates for any bridge, culvert, road, ditch or

*(Continued on page 16)*

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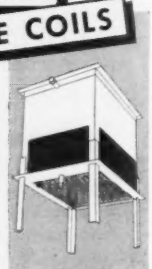
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**FOR THE FIRST TIME, *FACTS* ARE AVAILABLE. Here at last is factual information on the use of consulting engineers on Federal public works projects. In answer to charges of excessive fees, 118 consulting firms report on 1,464 engineering service contracts with seventeen different agencies giving actual fees, construction costs, and types of projects. This 144-page report has been sent to Congressional committees and Federal agencies, and contains full information on many types of public works construction, including:**

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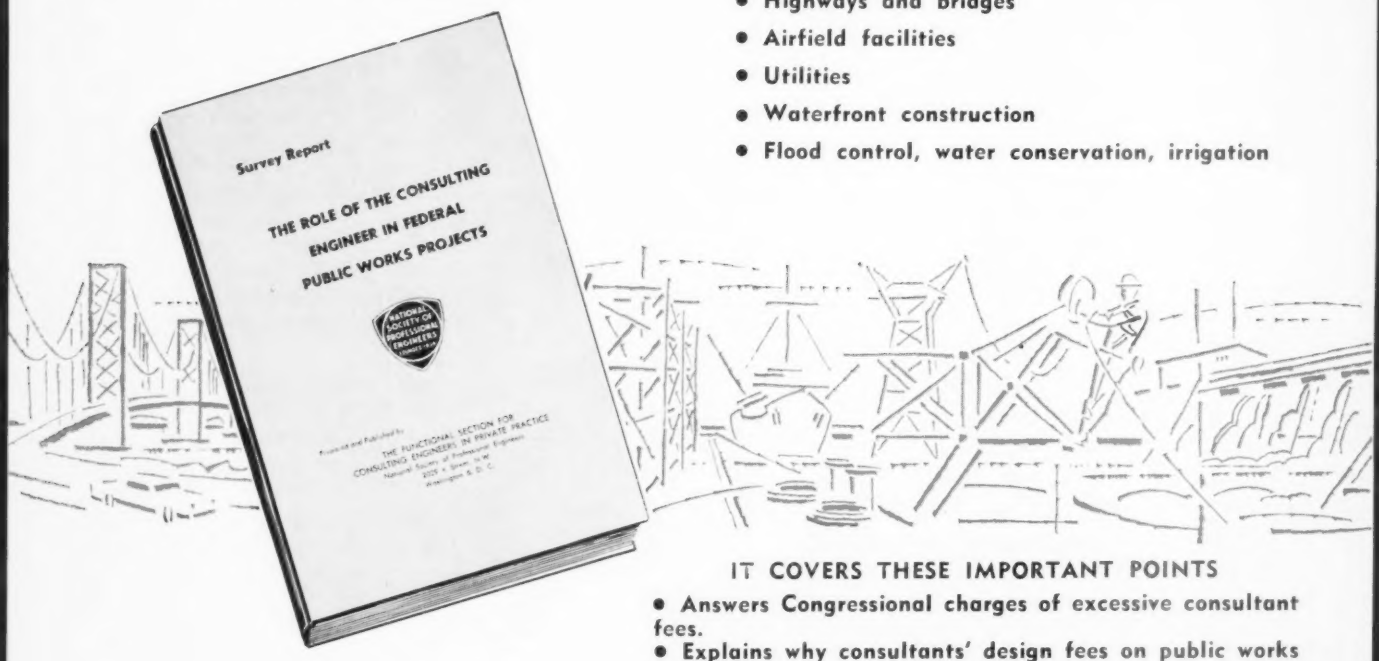
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- **Contains statements by prominent engineers in both government and private practice on the correct use of consultants on public works projects.**

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*(Continued from page 14)*

other public work to be constructed by the county."

The opinion concluded that should the county surveyor engage in any of the prescribed activities by virtue of a separate contract with the board of county commissioners and receive extra compensation therefor, such contract would be void as being contrary to public policy.

### Study Group Recommends Special Commerce Office

A Special Advisory Committee of the National Academy of Sciences, reporting on a study of "The Role of the Department of Commerce in Science and Technology," has recommended the establishment of an Office of Assistant Secretary for Science and Technology. The new position should be filled, the report adds, by an official "with professional and management experience in science and technology."

Other recommendations leading to specific expansions of the Department's programs in science and technology included an increase in the size of professional staffs to implement the enlarged programs, and a larger fraction of professional staffs in the higher compensation grades to meet competition and to provide adequate incentive for attracting and holding engineers and scientists of high quality.

### Commission Proposed to Study Manpower Needs

The creation of a twelve-member Commission to undertake a comprehensive study and evaluation of defense manpower needs has been suggested by Senator Alexander Wiley of Wisconsin. Some objectives of the study group would be to determine the impact of the space age upon manpower requirements of the Armed Forces, to recommend ways and means not only for providing, but also for more effective utilization of, adequately trained manpower, and to eliminate overlapping, duplication and unnecessary rivalry in the armed services in utilizing personnel.

## CSC Announces Change in Standards

To improve the Federal Government's ability to recruit superior applicants for research and development jobs, the Civil Service Commission has recently announced a change in its qualifications standards for such positions to permit top-quality holders of master's and doctor's degrees to qualify for appointment at grades GS-9 and GS-12, respectively, instead of grades 7 and 11.

Holders of master's degrees in engineering and most physical science positions will start at $6,285 a year (3rd step of grade 9), while those with doctor's degrees at $8,810 (3rd step of grade 12). Other R & D positions will be filled at the basic pay rate of the grade—$5,985 for grade 9 and $8,330 for grade 12.

The CSC action represents an extension of the "quality feature" which the Commission introduced into its campus recruitment program following the passage of the Classified Pay Increase Act of 1958 which authorized outstanding holders of bachelor's degrees to qualify for appointment at grade 7, rather than at grade 5.

Under the new qualification standards, the CSC contemplates that roughly only the top quarter of the master's degree graduates will qualify for GS-9; while the top half of the Ph.D graduates may be considered for grade 12. In determining which advanced-degree graduates will be eligible for the higher starting positions, the CSC will rely heavily on evaluations by officials of colleges and universities who will be asked to make an appraisal of each applicant for a Federal position. The institution's rating will be accepted without further review.

This development closely follows a suggestion made several months ago to the Commission by NSPE. At that time the National Society suggested that starting grades for master's degree holders be raised to GS-9 since with outstanding bachelor's degree holders also starting at GS-7, it would appear that "insofar as starting salary and position are concerned, the Federal Government offers no inducement to an individual to continue his formal education toward the attainment of a master's degree."

---

### Anfuso Introduces Bill To Coordinate Programs

Representative Victor L. Anfuso of New York, one of the most ardent proponents of legislation relating to engineering and scientific activities, has introduced a bill to establish a Commission on Coordination of Scientific Activities to conduct a study and investigation of methods for coordinating the country's engineering, scientific and technological programs.

The bill declares that engineering and scientific efforts "are presently being conducted by many departments and agencies under various programs and authorities, with resulting inefficiency where the conduct of such activities involves duplication of effort or leaves gaps in areas urgently requiring developments." The purpose of the Anfuso measure would be to provide a basis on which a more effective coordination of these activities can be achieved.

The proposed study Commission would consist of nine members, each of whom "shall be a recognized scientist or engineer or a qualified expert in a field involved in or related to one or more of the scientific, technological, or engineering programs of the United States." Appointments, of three members each, would be made by the President, Vice President, and Speaker of the House. Commission members would receive a salary of $15,000 per year. A final report would be due from the Commission not later than two years from the date of its creation. (H.R. 11655)

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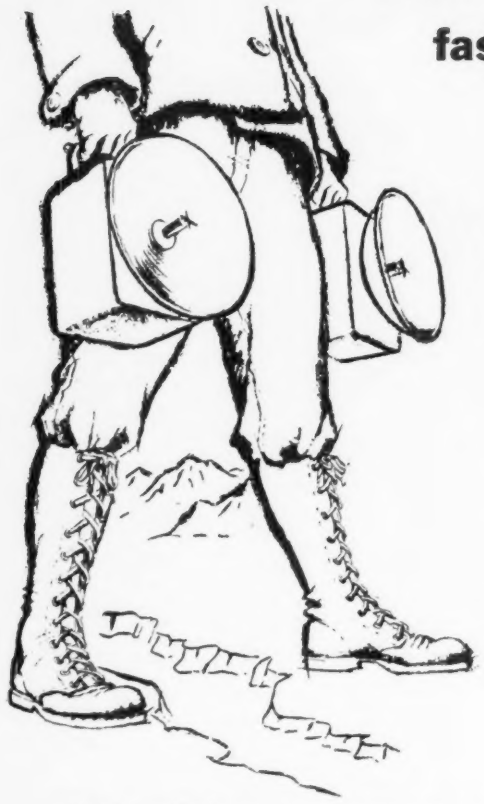

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# Western Electric 'No-Union' Vote Hailed by Pres. Mosher

"The overwhelming expression of Western Electric engineers against union representation is additional confirmation that the industrially employed engineer of today prefers a professional approach toward engineer-management relations, rather than that offered to him by unions," Harold A. Mosher, president of the National Society, has declared.

Mr. Mosher's statement followed release by the National Labor Relations Board of the vote tally in the election conducted among professional employees at Western Electric installations throughout the country in which engineers voted against representation by the Council of Western Electric Professional Employees-National, a collective bargaining organization affiliated with the Engineers and Scientists of America.

"The National Society of Professional Engineers is particularly gratified by the large 'no-union' vote in this highly significant election because it emphasizes the soundness of the Society's position that collective bargaining for professional engineers is in conflict with the basic principles of a professional individual," Mr. Mosher added. "We believe that Western Electric engineers, will now be in a position to move ahead along professional lines and in accord with professional standards."

Referring to an open letter sent to all Western Electric engineers by NSPE several weeks before the election, Mr. Mosher declared that "our statement then that the union method has been given a fair trial —and has been found wanting is strongly reinforced by the election results. The Western Electric engineers have indicated their dissatisfaction with the CWEPE-N approach and the entire union concept as forcefully epitomized by the Council."

The Society's president added that "we know this victory for professionalism will set the stage and serve as an example to industrially-employed engineers everywhere, who, given a full and free election choice, will continue to reject the overtures of collective bargaining organizations, regardless of the guise under which such efforts are attempted.

"The National Society will renew with even stronger conviction its efforts on behalf of engineering professionalism to assure a continuation of the trend away from unionization," he said. "We are firmly convinced that although a great deal of hard and vigorous work remains, the Western Electric 'no-union' vote brings the engineer in industry significantly closer toward the universal concept of professionalism."

### Reject Union . . .

**By a margin of almost five to three, Western Electric engineers voted on May 10 to reject representation by the Council of Western Electric Professional Employees—National (ESA).**

**The actual count, which was not tabulated until May 16 because of the nation-wide dispersion of the professional unit, was 3,970 to 2,603 against representation by CWEPE-N. Of those eligible, 1,100 engineers abstained from the proceedings, with an additional 108 ballots being challenged.**

### Wisconsin Industrial Award

Presentation of the first Wisconsin SPE Industrial Professional Development Award to the Falk Corporation was made at the recent annual meeting of the State Society. Shown, l.-r., are: Past WSPE President William J. Urban, representing the Falk Corporation; B. G. Elliott, chairman, WSPE Awards Committee, and NSPE vice president-elect, and Richard S. Falk, secretary of the Corporation.

## Sperry and Union Clash Over Affiliation Move

Sperry Gyroscope Company has served notice that it does not intend to let the independent Engineers Association succeed in its bid to affiliate with the International Union of Electrical Workers in violation of their contract agreement.

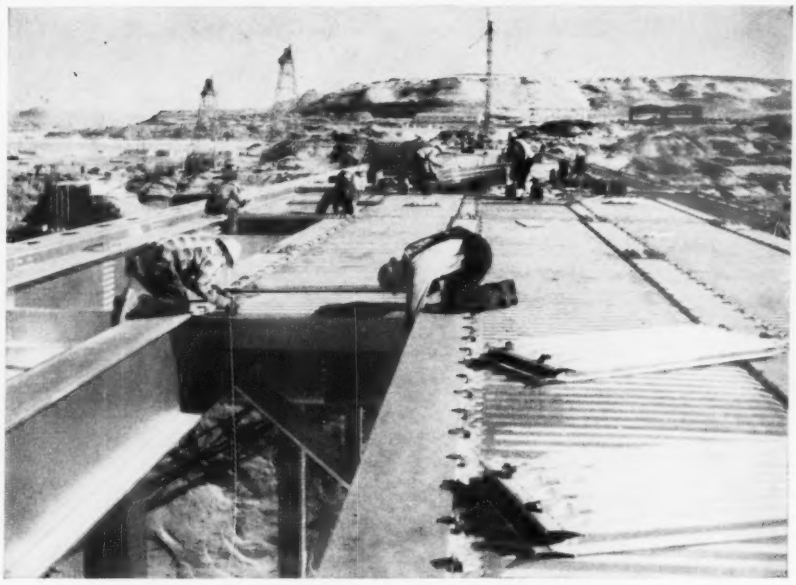
The focal point of the disagreement is a clause in the contract which requires that any election held to decide affiliation with a union representing production employees must be conducted among the entire bargaining unit and not just among EA members. Since EA's membership comprises only about forty per cent of the bargaining unit, conducting the election according to the terms of the contract would jeopardize the union's chances for affiliation with IUE.

The union contends that the contract clause is legally unenforceable since it allows nonmembers to have a voice in the affairs of an organization. They further claim that they informed management of the alleged invalidity at the time the contract was negotiated, but because of the company's insistence on the inclusion of the clause they had to sign the contract to avoid a strike. EA states they "will take all legal steps" to avoid an election in the entire bargaining unit.

In a bulletin to all engineers, the company hit back at the union's "assumed posture of 'morality' in the EA's attempt to deny nonmembers their plain rights under this clause."

The company denies union claims that the clause was called "illegal" at the time the contract was signed, and in the conclusion of the bulletin states firmly that, "The company will take every step available to see that the contract rights are upheld. Whether this will be through arbitration or court action or election proceedings remains to be determined by the course of events. In any event, there should be no doubt in anyone's mind that: *You do not have to become an EA member in order to express your choice under this contract.*"


# Glen Canyon Bridge Project



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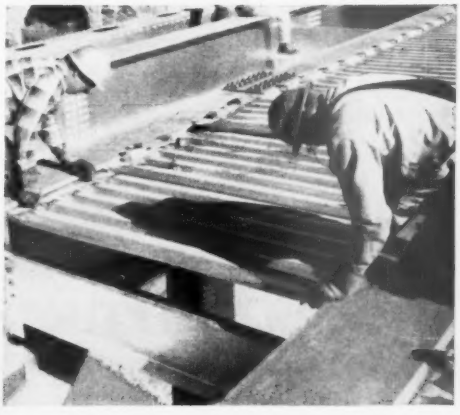
Photos by U.S. Bureau of Reclamation



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**Above:** Ford Motor do Brazil S.A., in Sao Paulo, manufactures complete trucks, from engine through final assembly. Touring the plant with Dr. Hicks are, left, J. Hutchens, general manufacturing manager, and Dr. Lauro de Barros Siciliano, Ford public relations manager and president of the Sao Paulo Highway Commission.

**Upper left:** The "face" of a nation. This woman works on telephone equipment, a principal product of Standard Electric Argentina at San Isidro.

**Left:** Earnest and fruitful discussions took place in Buenos Aires at the Union Industrial Argentina. With Mr. Chipp, left, is R. Montaldo, a leading engineer.

## Ingenieros de Sudamerica . . .

# P.E. 'Ambassadors' Visit Latin Colleagues in 11,000-Mile Mission

By

Dr. Beatrice A. Hicks, P.E., and Rodney D. Chipp, P.E.

NSPE's 'People-to-People' Representatives

Not too long ago a country in South America with which the United States has not always enjoyed the best relations was having trouble with an oil well—the local people simply could not stop the flow. Calls for help to the United States were answered by the arrival of two "engineers" attired in high heeled boots and dungarees. In short order they had signed a contract for $60,000 to stop the flow.

Two events followed which in many ways typify the present image of the United States engineer in South America. It took only five days at the well to bring the gushing oil under control. To the great credit of the two "engineers" and to the benefit of U.S. relations and public image in that country, these men reduced the fee to $10,000. But—during the five days work these men drank copious quantities of Coca-Cola at the self-established inflation price of $1 each, casually

The Americans arrive in Rio de Janeiro from New York at Galeão Airport. Shown, l.-r., are: Dr. F. Saturnino de Brito Filho, president, Brazilian Federation of Engineering Associations; Dr. Beatrice Hicks; Rodney Chipp; Dr. Francisco de Magalhães Castro, director of International Relations Committee, Brazilian Federation of Engineering Associations, and Dimitri Trone, consultant—engineering, General Electric S.A., Rio de Janeiro.

thrown on the counter. The economy of the town was quickly upset.

Doubtless, these two men were not members of the NSPE. But they were North Americans, and the local people thought they were engineers. So picture for yourselves the present prevailing image, in that town at least, of the "American Engineer."

In this little story, one of the first told your ambassadors during their recent month-long tour of five South American countries, we find the crux of our problem in South America. There are hundreds of U.S. engineers in South America, and a heavy rotation of personnel aggravates the situation. The U.S. engineer is praised and appreciated for much good that he does, and blamed and criticized for much bad or negative conduct. Inevitably the latter predominates as the most strongly held image.

To discover at least some of the facts concerning this situation, to uncover some of the reasons for it, to determine the true attitude of educated, respected South American engineering people, and to bring home at least some recommendation for correction of the problem, the NSPE in April, 1959, initiated "Project Ambassador."

Dr. Clark A. Dunn, then president of the National Society at the silver anniversary meeting in New York City last June, stated the purposes and aims of this unique project. "All American engineers and technicians working abroad," Dr. Dunn said, "must acquit themselves well as unofficial representatives of the United States and the corporations which employ them. If they do not, the publicity inevitably generated is harmful not only to the profession of engineering but also to our country. The situation is not critical, our objective is to do whatever will help it from becoming so. We cannot undertake preventive maintenance with respect to tourists and businessmen, but as a professional society we will try to define the problems faced by engineers overseas and those with whom they rub elbows—and then see what we can do to solve them. I believe we are the first non-government group in the United States to undertake an effort of this kind."

In one month we were to visit five countries—Brazil, Argentina, Uruguay, Chile, and Peru—to discuss with leading South American engineers, deans of universities, government officials and industrialists the human relations problems which exist or may in future exist between South American and North American engineers. Our mission was to obtain from these people their views regarding problems of working and living relationships—not to express our views.

The nature of our trip and the compression of time prevented our making an exhaustive study. Nonetheless, thanks to exceptional arrangements and the unstinting kindness and cooperation of our South American as well as U.S. company hosts, it is our conviction that this mission was a success. Although we visited only five countries, we are reasonably certain that the observations made and the conclusions we have reached would apply almost equally to the other Latin American countries. We believe our discussions uncovered the principal, most prevalent problems. They turn out to be common from one country to another.

A prime reason for the success of the trip was the fact that NSPE made the arrangements for our visits and discussions through a principal engineering society in each country, rather than through State Department or U.S. business channels. The various engineering clubs and societies include the most respected South American engineers. They are well-acquainted with U.S. engineers in their countries, have easy access to educational institutions and ready entree to the government ministries. They also are members of the trade associations.

Assembly of telephone instruments at the Compania Standard Electric Argentina, at San Isidro.

Extremely helpful information, especially on licensing (registration) of engineers, standards and practices, came from the Rio meeting at the Brazilian Federal Council of Engineering and Architecture. Facing the "Ambassadors" are Dr. Adolfo Morales de los Rios Filho, council president; Dimitri Trone, General Electric S.A.; Dr. F. Saturnino de Brito Filho, president of the Brazilian Federation of Engineering Associations, and Dr. Jose Hermogenes Tolentino de Carvalho.

In addition, many North American engineers and businessmen were extremely helpful and hospitable. They were, in fact, an added source of information, furnishing their views of these problems from the American side. But keep in mind that our principal concern was to determine the views of the South Americans. In every instance, in each country, these generous and gracious hosts were so anxious to make our visit worthwhile, so eager to join us in serious consideration of these problems, little time was left in any day for anything other than the purpose of our trip. The societies responsible in each country were: in Brazil, Federacao Brasileira de Associacoes de Engenheiros; in Argentina, Centro Argentino de Ingenieros; in Uruguay, Association Ingenieros del Uruguay and UPADI; in Chili, Instituto de Ingenieros de Chile, and in Peru, Sociedad de Ingenieros del Peru.

Our days were largely occupied in discussion sessions with the various institutes, societies, educators and government people. We succeeded also in visiting a representative, cross-section group of businesses and industries among the various engineering specialties. In Brazil we saw the General Electric "Fabrica Mazda" and a Ford plant for manufacture of complete trucks; the Piratininga steam power plant, the Cubatao hydro-electric power plant, the Bernardes oil refinery of Petrobras, the famed Sao Paulo dual highway, and that marvel of the decade, Brazilia.

In Montevideo we toured a rubber goods, tire and shoe manufacturing company, FUNSA. In Argentina we visited the remarkable IKA (Kaiser) plant and Fiat works at Cordova, and in Buenos Aires the Compania Standard Electric Argentina, an ITT subsidiary, and toured the port facilities. Visits in Chile were highlighted by the concentrate plant at La Africana copper mine and the San Gregorio self-help housing project, while in Valparaiso we saw a new telephone company office using multifrequency dialing. In Peru we visited the Marcona and Acari iron mines, inspected the Central Highway project and visited the Goodyear tire plant.

To view the U.S. engineer in South America in proper perspective and to consider the problems which he faces and those which he creates, it is first essential to place him against the social and professional background with which he must work and live. To this end we first will pass on our observations of engineering and the South American engineer, in South America. A number of major conclusions stand out.

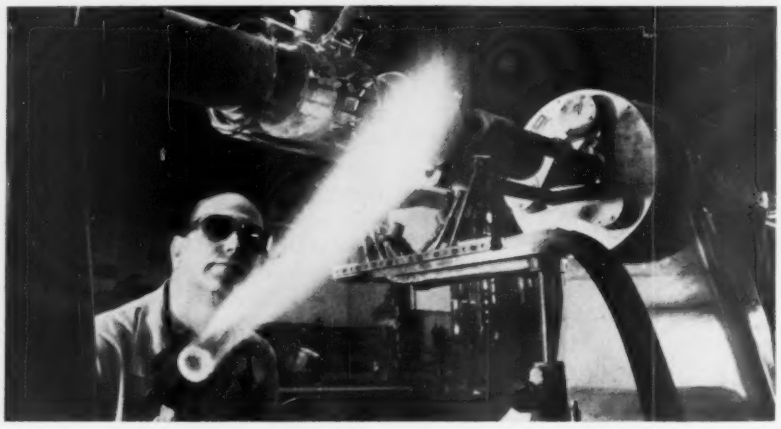
The distribution of engineers among the various disciplines or specialties is quite different from our own present day picture. They follow the pattern of our own country as it has progressed under the industrial revolution. Those countries least industrialized tend to

Technicians of the Compania Peruana de Telefonos Ltda. go through special training courses before being given specific assignments.

TV picture tubes are among the products manufactured in the Rio plant of Standard Electrica, S.A., ITT's Brazilian subsidiary.

have a predominant proportion of civil engineers as opposed to electrical, mechanical, chemical engineers, etc. The mining engineer, as everywhere, is a distinct engineering specialty. Consider as one example Brazil, perhaps the most industrialized of the South American countries, where among all engineers approximately 75 per cent are civil engineers of one type or other, 10 per cent mechanical, 10 per cent electrical and 5 per cent are engaged in management and administration. The breakdown among civil engineers is: 35 per cent housing and building; 10 per cent structural (bridges and large works) ; 20 per cent highway and railroad, and 10 per cent hydraulic, airport, harbors, water supply and drainage. The civil engineer figure increases proportionately upward as you pass from Brazil to Argentina, to Chile to Peru. These approximate distributions represent only engineers in practice; they do not reflect current engineering school enrollments and recent graduates. Growing demands of native industry are forcing a discernible trend to the award of the degree of "industrial engineer," generally a combination of electrical and mechanical (what we know as an industrial engineer does not yet exist in South America). In some instances they are also designated "electro-mechanical engineer." University faculties are, to some extent, pushing this trend as an aid to the development of their countries' industry.

University engineering enrollments of girls runs from one per cent to three per cent of total student body, closely comparable to U.S. university experience. In architecture school enrollments today at least one-third or more are women. We were unable to get an idea of the numbers and status of women already in engineering practice. Those few women engineers met on this trip were all under thiry-five years old. We may surmise that the training and utilization of women in engineering in South America will increase as advancing industrialization poses greater demands for all kinds of talent.



A variety of electron tubes are manufactured by ITT's Argentinian subsidiary, Standard Electric Argentina.

As to status, the South American engineer enjoys a position quite comparable to our own engineer in U.S. society, superseded, if at all, only by the doctor and lawyer. Status is not necessarily related to income. With relatively few industrial positions available, a large proportion of engineers work for the government. Many of these conduct their own private businesses, both through choice and as a matter of economic necessity.

This situation introduces another distinction, one which the U.S. engineer must clearly understand. The South American professional or businessman is never confronted with the "conflict of interest" philosophy of the U.S. The government appoints him or he is elected to office and simultaneously operates his own business, even though it may be engaged directly in business with his office or government ministry. For example, it is easily possible for an engineer to be a government official, professor at the university, consulting engineer and head of his own company, all at the same time. To understand this, the North American must recognize that any number of factors may be at play: this is the tradition; the low pay of some government posts forces the professional to continue producing income privately; many government and university teaching positions are only part-time activities; quite often the government appointment may be a matter of prestige more than actual responsibility, and finally, very often he is the most appropriate or the best qualified man for the post.

In general, South American engineering education and training in universities operated by the governments has followed the European pattern of lectures and recitations, with little emphasis on laboratory work. As we know, this often results in a good theoretician but also in an engineer less well-equipped for practical work. It may be surmised that, in addition to pursuing this method through tradition, the extremely high cost and lack of available foreign exchange to purchase good laboratory

equipment may be partly responsible for this situation. In addition, there has been the long-standing custom that the professional, himself, did not actually handle equipment. In any case, there is ample evidence that all this is changing.

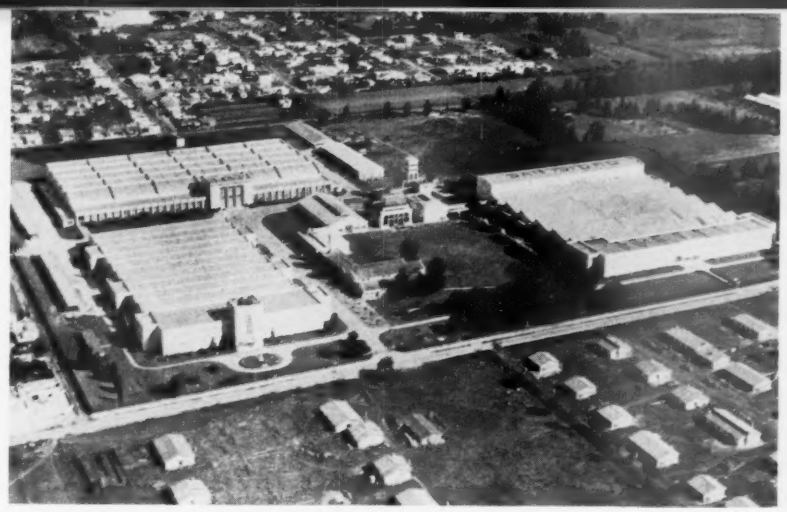
Educators we talked with are keenly conscious of the need for more and better lab work. They are working hard to improve this picture, and are tremendously proud of new lab equipment acquisitions and grateful for North American contributions. Examples of this were—telephone and radio equipment at Mackenzie in Sao Paulo; in Buenos Aires, extensive labs and a towing tank, both under construction; machine shops and electrical equipment at Valparaiso; a TV camera and transmitter built by the staff at Santiago; power equipment given by Westinghouse at Montevideo and by Brown Boveri at Lima, and textile equipment at Lima, furnished under Point-4 programs. The curricula of the universities are beginning to include an ample portion of lab work.

THERE seems to be a lack of trained technicians, as we know them, throughout Latin America. There is a very keen need for technicians in industry. A few schools, of which Santa Maria is best known, have definite programs for training technicians. Undoubtedly, this type of training will follow industrial progress in each country. Meanwhile, much current training is being undertaken by industry both on-the-job and in special courses. Some of these programs are exceptionally fine and well planned. In general, training aids must be more elaborate and more extensive than in similar U.S. installations, especially where the technicians are trained from scratch, on-the-job.

An industrial plant is often a complex of nationalities. As a result of World War II dislocations, many European, Asian and Near Eastern engineers and trained technicians moved to South America to stay. By now they are well-integrated and assimilated, while most U.S. engineers are, by comparison, transients. For instance, at the Piratininga Steam Plant in Sao Paulo, there are seventeen different nationalities among the engineering department technicians. In this plant, name plates, units of measurement and instruction books are in English. Very interestingly, throughout our travels we found several languages other than Portuguese and Spanish cropping up in plants. This is a matter of the origin of equipment. Most often found were English, German, and Italian.

We discovered numerous areas of difference in standards and professional practice. Perhaps the most noteworthy and the one which attracted most frequent discussion as well as interest on the part of our hosts, is the subject of registration, or as we know it, the licensing of engineers to authorize them to practice. It is an area which lends itself particularly to interhemisphere cooperation or reciprocity arrangements. The picture is not a simple one and is undergoing current changes, however, we feel it worthwhile to point out some of the interesting aspects in each of the countries visited.

There is not, in South America, the same distinction between "engineer" and "professional engineer" with which we are familiar. In general, registration is accomplished by registering the diploma of a recognized school with the appropriate government body without any period of experience and subsequent examination. In some cases the foreign educated engineer is required to take an examination, usually oral. It would appear that, with the exception of Brazil, there is no restriction on citizenship.



IKA, the Kaiser plant at Cordoba, Argentina, fabricates trucks from engine manufacture through final assembly. Kaiser built and put plant into operation in thirteen months, in spite of absence of local sub-contractor supply sources. This is one of the superb accomplishments of U.S. engineering in South America.

An inside assembly-line view of the IKA plant at Cordoba.

Our hosts expressed surprise at U.S. standards for licensing—experience, period of responsible charge, and examination. Many people with whom we talked seriously questioned the broadness of professional engineer examinations in the United States, believing that a person pursuing a particular specialty should be examined only in that specialty. Apparently, such people fail to recognize that an engineer in responsible charge of a project must have a comprehension of all technical areas. They admired our insistence on experience in carrying out theories learned in school, but acknowledged that in their country the shortage of engineers does not permit any waiting period; further, requirements that an engineer be registered before he works as an engineer for the government, or in the case of Brazil before he works as an engineer in the country, does not provide for any training period.

The Brazilian laws are numerous and detailed. All persons using the title of "engineer" must be registered whether in government, private industry or as consultants. Registration is handled by the Federal Council of Engineering and Architecture, an autonomous body which reports direct to the president and which operates through regional councils. An applicant is registered on the basis of examination of his record at school and the school's curriculum, with no subsequent experience or examination required. Permanent registration may be obtained by: (1) all Brazilians graduated in approved curriculums from engineering schools of foreign universities, (2) all Brazilians graduated from Brazilian engineering schools, and (3) all foreigners graduated from Brazilian engineering schools. Temporary, 3-year renewable registration may be obtained by foreigners graduated from foreign engineering schools and may be made permanent only if the engineer is naturalized.

There have been recent changes in the Argentinian provisions. As of now, no formal registration or licensing is required. A diploma from an Argentinian engineering school confers the right to practice. This is required only for practice before the public or for government service. There are no citizenship restrictions. A person whose degree was awarded by a foreign university and who wishes to work for the government or before the public must take an examination, including the Spanish language, at the university.

At luncheon at the General Electric factory in Rio de Janeiro, called "Fabrica Mazda" locally, Donald Wright, GESA president, presents exact replica of Edison's original incandescent lamps as memento of the "Ambassadors' " visit.

A diploma from a Uruguayan university is sufficient authority to practice engineering in that country. It is not registered with the government or any other recording body. A reciprocal arrangement recognizes diplomas of Argentinian and Chilean universities.

Chile has recently established the Colegio de Ingenieros, a council or center for registration of engineers. Its object is to protect the public against misrepresentation. While most established engineers have now registered, there was some suggestion that they did not feel it was necessary and have done so primarily to set an example for young engineers and new graduates.

Any Peruvian who holds a diploma from a Peruvian university is automatically recognized for practice. To deal with the government, however, he must additionally register by application with the "Official Enrolling Office for Engineers" in the ministry of public works.

Industrial safety as we know it is almost entirely lacking in South American industry. However, the pressures of rapid industrialization are forcing acceptance of the requirement for formal safety programs. Such safety engineering as we encountered was handled by local personnel trained on-the-job or by attending conventions. We did not hear of any school that has a course in safety engineering. Insurance companies, as far as we could determine, do not exert any influence in this respect by using safety engineers or inspections. Some U.S. companies have started programs at the foreman and supervisor levels, among them Goodyear and General Electric. This attitude toward safety is characteristic of both the South American and many Europeans; appearing often as a costly luxury, it is simply neglected. To correct this situation will require intensive educational campaigns, plus incentives, plus legal or insurance company pressures to make the South American industries as safety conscious as is our own U.S. industry. Learning and appreciating safety must closely parallel industrial advance. Great progress could be made if all South American engineering schools established adequate safety courses.

The attitude toward maintenance closely parallels that of safety. Caring for equipment is not a local characteristic of the South American. Serious financial loss through lack of maintenance is common. Within industrial plants, many people are involved in considerations of maintenance, as com-

pared to safety, and the former is far harder to control. Again, intensive education is indicated.

THERE are numerous small differences and difficulties which the U.S. engineer must recognize and with which he must learn to cope. For example, the metric system. While many U.S. research engineers work with this system, most U.S. engineers are accustomed to English units of measurement. All who go to South America must be prepared to think and work with metric units. In practice, however, both systems are in use, even though in some countries the metric system is established by law. For instance, if equipment is purchased from an English unit country, the Latin uses the English unit; this is particularly true of the heavy equipment industries which are dependent for heavy equipment on outside sources.

Specifications? The South American engineer has not yet learned how to specify his requirements so that he obtains, through the purchasing department, parts of suitable quality, while still permitting them to buy at lowest price. U.S. companies have brought about some awareness of this by introducing increased use of specs and standards, and by training and aiding suppliers.

These brief comments have provided a glimpse of the engineering profession in South America. On the other side, let's take a look at the U.S. engineer in South America as seen through the eyes of the South American engineers with whom we talked.

Two contradictory comments were made to us throughout the South American countries we visited. On the one hand, they think that the North American engineer who works there must be a flexible broad-background person as he will be required to do many things for himself. Their industries often cannot supply such things as components, spare parts, and basic materials and he must be able to do this often without adequate measuring and testing or manufacturing equipment. On the other hand, the United States engineer is needed because he is a specialist with many years of experience in a specific area of engineering. Ideally, what appears to be needed is a man who is a specialist in many fields, (who has also learned the language, customs, economics and politics of the country and who has patience, fortitude, and belief in what he is doing).

In every country we visited the criticisms voiced about the U.S. engineer were the same. The intelligent South Americans are quick to praise the North American engineer's good points – friendliness, generally professional competence, generosity and helpfulness; but they point out that he impairs his true usefulness by his negative qualities. In brief, these are:

- Does not know the language.
- Little or no background in history, traditions and culture.
- Does not join in professional society activities.
- Not prepared for the conditions under which they will work.
- Often withdraws into U.S. colonies.
- Lack of patience and sometimes plain bad manners.

Our hosts were of the opinion that the biggest job for the North American going to South America is to prepare himself mentally that the country is different and that many things he does by habit in the United States will not be possible in his new locale, and that he will have to develop new habits. He must be prepared to accept the differences and not be irritated with such things as telephone, language, transportation, service, laundry, and all the other areas to which he has never had to give conscious thought.

Language means communication. Language is the medium through which one is able to learn about a country, its customs, its culture, its life. The values taken

Prime advice from the "Ambassadors" for American engineers in South America: Learn the language and join in local professional and social activities!

from a country are in proportion to the participation in the activities of a country; you cannot take anything from stagnant isolation.

The U.S. engineer expresses irritation at the language barrier: it denies him his full effectiveness. When he cannot understand or speak the language, he withdraws into the comfort and security of his own isolated English speaking colony, shutting himself off from the chance to learn about the country or the atmosphere surrounding his work. He is not able to fully appreciate the broad technical situation, thus frustrating him and reducing his value. He is uncomfortable socially and professionally in the presence of his South American peers and superiors, and does not participate in those extra-curricular professional activities which would benefit him and the local people in common. He cannot give proper instructions to those working under him and an interpreter is suitable only on a short-term basis.

Santa Maria University in Valparaiso is one of the finest engineering schools in South America. A view here of the engine laboratory.

In addition to the social needs for speaking the native language, an engineer must learn or pick up the specialized vocabulary of the country and industry. Word usage differs from place to place and each industry has its own jargon, as in the U.S. For example, the South American billion is expressed as thousands of millions; the Spanish "billion" means a million million. Also, such common English words as "rate" and "performance" have no Spanish equivalent. For such words, descriptive phrases, sentences and sometimes paragraphs must be used.

The problem of ignorance of the country's customs, culture, history and traditions is simply that you remain much an outsider, even when you can speak the language. You expose yourself to error and the possibility of offending the sensitivities of your hosts. You can't understand the reasons for many things and therefore do not react intelligently and normally to situations with which you may be confronted. You deny yourself many great personal pleasures and intellectual enjoyment.

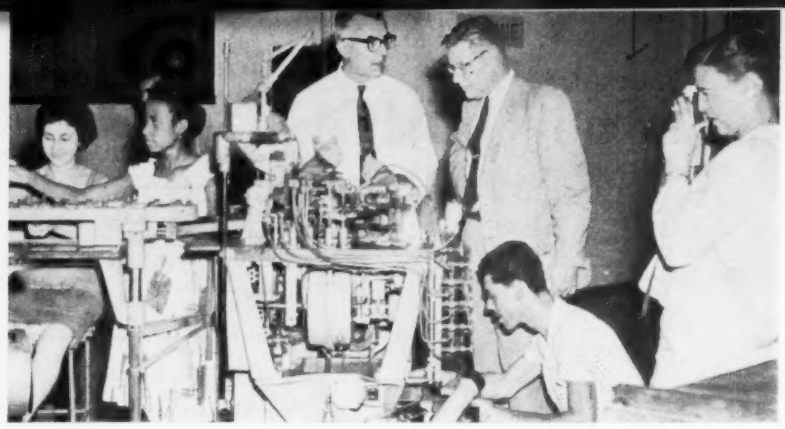
One of the most often repeated criticisms was that U.S. engineers do not join or participate in the activities of the local engineering clubs and societies. This aloofness is resented. In every instance but one, in the countries we visited, these clubs have continuously extended warm invitations to U.S. engineers to accept membership. We are told that the usual U.S. engineer is not even aware that this failure to participate hurts the feelings of his South American cohorts. Not only would joining do much to generate good feeling, the clubs provide the North American a ready-made help in learning the language under sympathetic conditions, and a source of improving his technical competence on the job. These clubs are a source of information and help.

When the North American arrives on the job in South America without knowing and understanding the conditions under which he will work and live, he is disappointed, unhappy and cannot integrate himself into his surroundings. In his frustration he often complains, causing unrest or ill will among the South American people with whom he works. He should be thoroughly briefed on all the matters presented in our discussion of the South American engineering profession: he must know in advance not to expect safety engineering help; that there is little regard for maintenance; that subcontractors generally do not exist; that native technical reporting is poor; he must understand that he will have to be prepared to do many more things for himself, and he must be specifically prepared to cope with the ill effects of inflation on his work.

There is little need to discuss the matters of impatience and bad manners. These are more matters of upbringing than engineering training.

A WORD about wives. Too often the wife accompanying an engineer to South America is set down in the middle of a seeming nowhere, with no purpose and little to do. Many problems frequently result, interfering with the husband's effectiveness and contributing at times to a poor image for our country. A wife needs to know how she will live and what she needs to do it with. Then she must face the problem and think out what she will

In Santiago, Chile, at Braden Copper Company reception, Rodney Chipp is flanked by Ernesto Ayala, president of the Institute of Engineers, and S. Lopez, manager of "Maipu" Steel Manufacturing Company.



Dr. E. Falcao of General Electric S.A. (Rio) explains operation of a semi-automatic lamp basing machine in the lamp factory.

do with so much time on her hands; and preferably she will make a specific plan for occupying her idle time.

The South American looks to the North American as a friend and helper. Once in a while a technically incompetent person is sent down. He cannot hope to gain and hold the respect of the local engineers who work with or under him. The situation is also aggravated by the prevailing pay differential (usually two to three times greater than the local engineer's). Finally, this incompetence may be accompanied by an aggressive attitude and social aloofness. Such a combination certainly does not represent the U.S. engineer, but when it occurs it is so evident it is remembered.

There is no substitute for competence, integrity and kindness, and where it exists the factual nature of engineering can lead to rapid and sound progress.

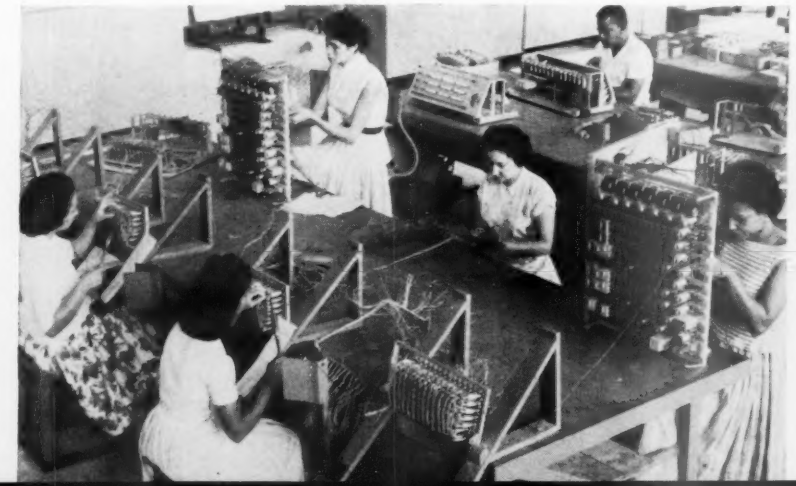
How can the U.S. engineer about to go to South America better equip himself for working and living there? How can he make himself more effective? How can he be a better ambassador for our country?

There is one big answer to these questions—he can studiously and diligently prepare himself mentally, psychologically and professionally, and his family as well, to adapt himself to the differences in thinking, living, customs and attitudes. There are many specific steps he can take. From our own observations and discussions we summarize a few of these, and add a few do's and don'ts.

Professionally the U.S. engineer should be prepared to work under very different circumstances than those to which he is accustomed. He will not find a corps of trained technicians to help him. He will not find a ready-made industrial production system which provides the wealth of subcontracting services to which he is accustomed. He must be prepared to cope with lack of industrial safety and maintenance, and be ready to do something about it. He should learn how to work in the presence of inflation, and beat it. He must realize that there may be several ways, technically, to solve a problem, and that the local engineer frequently has good reasons for adopting his own particular way; before insisting on his way, the U.S. engineer must prove it is better technically, after taking into account all local situations. As in his social life, he must take steps to acquire a command of the language, and especially the technical language with all its differences and nuances, and the differences of usage. He must be at home with differences in measurement. He cannot expect the same quality of technical writing and reporting to which he is used, and should help the local engineer to prepare more useful reports. He must respect and acknowledge the courtesies and titles of South American professionals, adopting them as standard in his speech and everyday relationships. Most U.S. engineers taking posts in South America must consider their principal function as including that of a teacher; they likely will spend a few years training local personnel to take over their jobs and will then come home or move on. He should join one of the native engineering societies and should participate actively in its programs and social life, contributing to it as well as taking from it.

On the personal side he, again, should master the language. He should go to his post with an understanding of the country's history, politics, geography, customs and traditions. He must know at least enough not to ask stupid questions, or to give embarassing answers. His wife and family should prepare themselves to accommodate to differences in living, in facilities and services, in food and drink, in weather, in dress and in social customs. Where possible, he and his wife should become part of the local social life, to the extent invited and welcomed. He must avoid discussion of political matters about which he is not fully informed, and if he doesn't like or understand something, he should avoid criticising or talking about it. He should avoid making points

Assembly of PABX equipment at Standard Electrica, S.A., ITT's Brazilian subsidiary, in Rio.



Santa Maria University students shown here are working with an oscilloscope in the electronics laboratory. Note English labelling.

about differences in customs and practices. Above all, he should not flaunt his wealth or more material means, should not snub those who have less or seem to be less well educated or less experienced.

If we had to single out one thing that the U.S. engineer should specifically do to prepare himself, it would be: *learn the language*. This accomplishment would go a long way toward helping to solve many of the other problems.

SOUTH AMERICA was an ideal choice for this first engineering fact-finding mission. It is a continent of vital concern, not alone because it is a key pin in our national defense schemes, but also for its industrial and technical potential. There are, today, more U.S. engineers and technicians working in South America than anywhere else outside our borders. North American industry has immense industrial and financial investment in South America.

South America represents a great potential demand for engineering assistance and cooperation. In this connection, our hosts were interested in some of our statistics. In 1900 in the U.S., the ratio of workers to engineers was about 250-to-1, today is it about 70-to-1. An average of the estimates that we received in South America indicated that, in the countries we visited, today a figure of 200 workers per engineer would be roughly correct. Thus, Latin American population growth coupled with increased industrialization indicates that more engineering assistance from North America will be needed while simultaneously the output of engineering graduates in South America must increase.

In the main, the problems are primarily those of interpersonal relationships complicated by language barriers and differing national customs, as well as some differences in professional practices. These problems are not insurmountable; there is much good will on both sides—many of the present difficulties can be avoided or minimized if the people we send to South America can go there better prepared for person-to-person contact in social, business and professional situations.

The amount of interest aroused by this visit should be kept active by the NSPE and other appropriate engineering organizations, both because of our very sincere reception and because the future will doubtless bring the need for greater cooperation and reciprocity, and to the extent that it should be developed, standardization of practices and policies. This is especially true in the area of licensing or registration.

It is our hope that this mission which we have just concluded will be the first step of a long-range NSPE program to better equip U.S. engineers to deal with the many social, cultural and professional differences which exist between the United States and other parts of the world.

Finally, we are grateful to have been selected to represent the society in this mission and for the wonderful experiences it brought us. We are especially grateful to the many, many very generous and thoughtful South Americans who gave us their time and hospitality to make this mission a success. We have thanked them privately. We wish it were possible to acknowledge our debt by naming them all in this article.—**End.**

**ON THE COVER:**

**Accompanied by Enrique Marchetti, architect of the project, the "Ambassadors" visited the San Gregorio, (Peru), aided-self-help housing project. Here an experimental house is going up. Blocks of wood, with shaped tongue and grooved edges on top and bottom, are put together by inexperienced workers to form a strongly built house. 4000 houses will be built at $1000 per house.**

Manufacturing PBX cable forms at Standard Electrica, S.A., ITT's Brazilian subsidiary, in Rio.

# FROM WASHINGTON

BY
MILTON F. LUNCH,
*N.S.P.E.'s Legislative Counsel*

## *Engineering Position In Coast Guard Soon To be Abolished* ►

The historic statutory post of Engineer in Chief of the Coast Guard is about to disappear, following the action of the Senate Committee on Interstate and Foreign Commerce reporting a House-passed omnibus bill on changes in the Coast Guard structure, and subsequent passage by the Senate without debate. The abolition of the present statutory base for the top engineering position in the service was the only item of controversy in the bill, and one which the Committee found "raised questions considerably more difficult to resolve."

Despite objections by NSPE and others that the proposed change might indicate a weakened prestige for engineering services at a time when the Coast Guard is increasingly reliant upon such professional services, the Senators felt that the change should not impair the engineering activity. "Engineering enters into a great many of the activities of the Coast Guard and, in line with the rising significance of scientific developments in the military services generally, it can be expected to continue to figure prominently in the operations of the Coast Guard in the foreseeable future."

Nevertheless, the Committee said it could see no reason why "the excellent reputation of the Coast Guard's engineer officers, and their fine performance standards, cannot be maintained just as well with engineering as a component of the administrative organization as it has been with engineering constituting a more or less separate entity."

In addition, the Committee said the opportunity for engineer officers to attain to flag rank will not be impaired with the Chief of Engineers having exactly the same stature as the other chiefs of offices in the organization. "Indeed, there would appear to be every reason and likelihood, under such a setup, for engineer officers to be as definitely in line for promotion to Commandant or Assistant Commandant as there would be for any other officers in the organization."

## ◄ *Brief Rundown on Important Legislation Before Adjournment*

**As Congress swings into its final month before adjournment for the political conventions, the following seems to be the outlook for several important pieces of legislation of a highly controversial nature:**

**DEPRESSED AREAS—The President has already vetoed the $251 million measure to provide loans and grants to help areas with chronic unemployment, including $50 million in 40-year loans and $35 million in grants to help state and local governments provide public facilities needed for industrial growth. It is generally conceded that the President's veto will stand up. The Administration position will undoubtedly be a major campaign issue in several states with a high unemployment rate.**

**SCHOOL AID—Although the vote may be close, the House is expected to pass a $975 million school construction bill which the President opposes. Earlier the Senate passed a $1,834,000,000 school aid bill, containing grants for teacher salaries and school buildings. The House bill would not provide for Federal funds for salaries. House sponsors hope the President will sign the more modest bill, but there is an equally good chance that he will veto it. If that happens the question of Federal school aid will also be a "hot" political issue this summer and fall.**

**COLLEGE PLANT AID—The Administration, through Secretary of Health, Education and Welfare Arthur S. Flemming, is plugging for a**

program to help the colleges build new classrooms, laboratories and other teaching plants through a 5-year program. Under the plan, the Government would guarantee private loans to independent colleges, and would offer cash grants equal to one-fourth of the loans obtained by colleges. The loans would be limited to $5 million each. The grants would be paid to the institutions over a 20-year period. Up to $500 million would be made available for this purpose. Publicly supported institutions would qualify for the grants, but would not need the loan guarantee because of their existing power to issue tax-exempt bonds. Secretary Flemming urged action this session, stating that the colleges and universities face a major crisis in 1964.

### Measuring of Cotton Acreage to be Studied ►

The House group handling appropriations for agriculture next year will look into the pros and cons of using private surveyors to measure cotton acreage versus having the work performed by employees of the county committees of the agriculture conservation program. The California Council of Civil Engineers and Land Surveyors has particularly objected to the refusal of the county committees, backed by the Agriculture Department, to accept certified surveys made by private practitioners. Representative Charles S. Gubser of California offered an amendment to require the use of private surveys during debate on the Agriculture Appropriation Bill, but withdrew it before a vote because it had not been considered by the Committee, and on the assurance of Rep. Jamie L. Whitten of Mississippi, chairman of the Agriculture Subcommittee of the Appropriations Committee, that the question would be investigated next year.

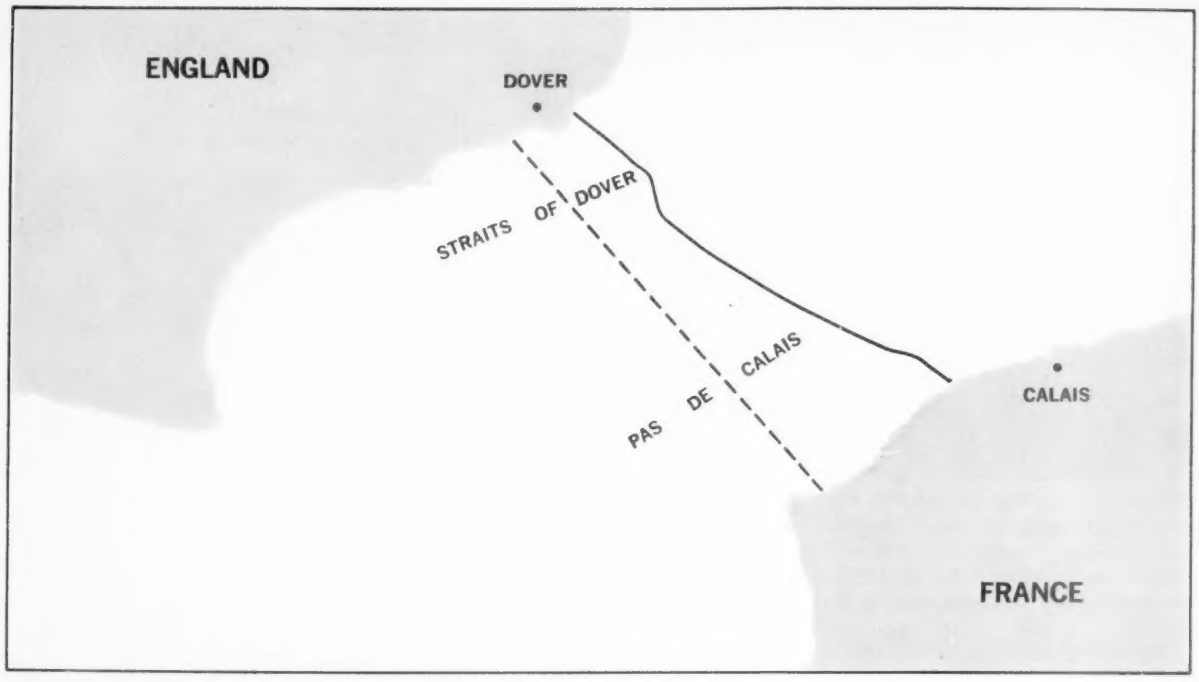
### ◄ Results of Special Scientific Report Now Available

A report of the first meeting of the Panel on Science and Technology, sponsored by the House Committee on Science and Astronautics, is described as "an historic first—the creation and initial meeting of the Panel on Science and Technology, an experiment in cooperative effort between this committee, the only one in Congress devoted to science across the board, and distinguished representatives of the scientific and engineering community of the Nation." Of particular interest to engineers, were the several pointed remarks of some panelists decrying the constant references to "science" without adequate recognition of the role of engineering. Professor Maurice J. Zucrow, an engineering expert in jet propulsion at Purdue, evoked applause with his opening statement: "Now, I am not a scientist. I am an engineer. I am very proud of it, too." Professor Zucrow emphasized the dangers of attributing all technical achievements to "science," citing recent newspaper stories about the Titan missile being fired by "scientists." "The scientists had nothing to do with it," he said. "It was the engineers who fired it, designed it, made it." He further told the Committee that it was "ridiculous and stupid" to believe that research is either basic or applied, referring to an experiment in his own laboratory: "In very simple terms here is a tube and I have a liquid flowing down the sides of the tube, and in the center there flows a gas. Under certain conditions you get instabilities or waves formed on the liquid. If I am talking to the National Science Foundation, the great basic researchers, I call this two-phase flow. If I am talking to the so-called engineering scientists I call it mass transfer. If I am talking to an engineer, I call it film cooling. And all of them are happy."

The full report (H. Report 1587) may be secured by writing the House Committee on Science and Astronautics, Washington 25, D. C.

### York, Purcell Opposed To Dept. of Science ►

On the Senate side, a Subcommittee on National Policy Machinery has been exploring the organization of government to meet pressing problems, and it has heard some views on the idea of a National Department of Science. Dr. Herbert York, assistant secretary of defense for research and engineering, opposed a separate department of science because the work involved must be related to the mission of the agency, although he told the committee that science and technology should be represented at the Cabinet and National Security Council level. Dr. Edward Purcell of Harvard agreed with York and suggested that Congress, instead, give statutory authority to the President's Science Advisory Committee.




# A Century-Old Dream: Linking England and France

More than 150 years ago, a French mining engineer approached Napoleon Bonaparte with a grandiose and visonary scheme to construct a carriage-way between England and France by means of a submarine tunnel under the English Channel.

Caught up in the spirit of the Peace of Amiens, the young engineer, Albert Mathieu, sparked the imagination of both England and France. But Bonaparte had more important things on his mind and Mathieu's sketches were tossed back into the files of what passed for science fiction in the early 1800's.

Like many engineering dreams, Mathieu's tunnel scheme did serve to arouse public interest and scientific curiosity; the possibility of actually linking England and the continent now became alive, if visionary, idea. Since Mathieu's bold plan of 1802, the idea has died a dozen final deaths only to come alive again on some engineer's drawing board.

Today, the idea of connecting England and France—either by tunnel or bridge—is very much alive. In fact, the scheme likely will become a completed reality within the next five to seven years.

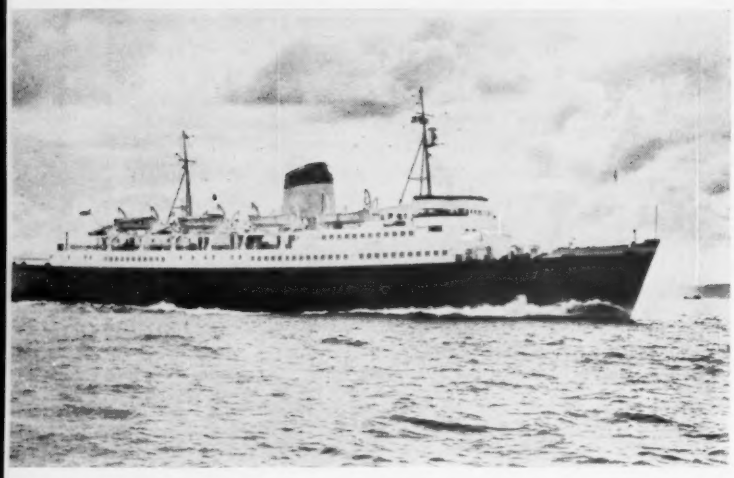
Less than two months ago, the Channel Study Group, composed of English, French, and American interests, submitted a detailed recommendation to the governments of England and France for the construction of railway tunnels between Dover and Calais.

**Proposed routes for the tunnels are shown on the map at the top of the page. The solid line at the top indicates a possible route for a bored tunnel through the lower chalk formation of the Straits of Dover. The broken line at the bottom is a suggested crossing for an immersed tunnel.**

Behind the recommendations were more than two and one-half years of technical engineering studies on every conceivable problem that might be encountered on the project.

It now appears definite that it is an engineering feasibility to provide a permanent link between England and France and, in turn, the remainder of the continent. Proposals have been brought forward for the construction of a bridge, railway tunnel, road tunnel, and combinations of each. The Channel Study Group made its recommendations for a railway tunnel primarily on grounds of economics.

By whatever method, the connecting link, if it becomes a reality, will be a historic event for both England and France. England, of course, has been an island with the choppy waters of the Channel providing something of a moat between it and the European continent. Modern transportation has



**Left:** Most of the English Channel crossings today are by means of ferry boats operated by the British and French railway systems. Here is the "Maid of Kent," the largest drive-in, drive-off car ferry in the British cross-channel fleet.

**Middle:** Improved engineering and construction methods have enhanced the technical feasability of the English Channel proposals. Many of the difficulties of underwater and over water construction have been solved.

**Bottom:** A sketch of tentative plans for a bridge over the English Channel.

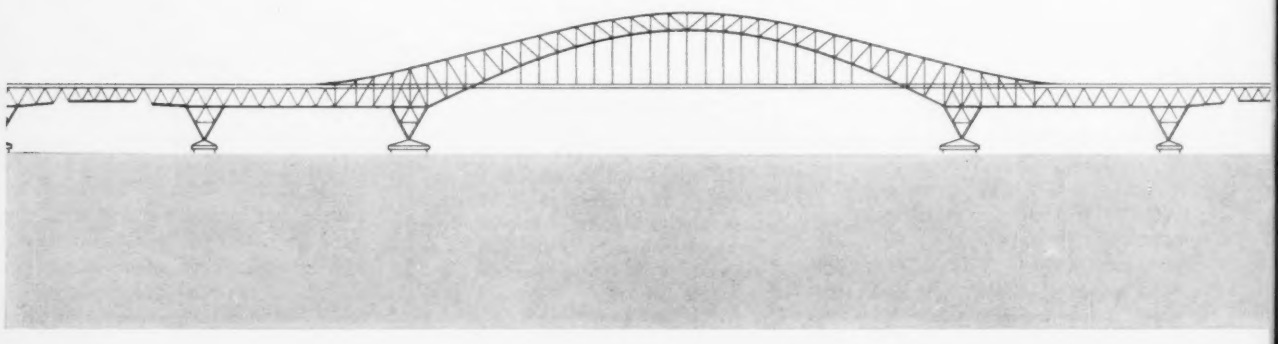
wiped out the realities of the isolation provided by the Channel, but that narrow strip of water still stands as a symbol of England's aloofness from its European neighbors.

However, more important than any symbols are the tremendous economic and convenience factors inherent in a permanent link with the continent. At the present time, the trip between Paris and London, via the ferry from Calais to Dover, takes anywhere from eight to eleven hours, not to mention the nuisance of loading and unloading at each end of the ferry. Under the plans for the tunnel, passengers would be able to make the trip in about four hours and twenty minutes in comfortable modern trains.

Supporters of the project are firmly convinced that the speed and convenience of the tunnel will result in a big upsurge of travel between England and France, particularly by automobile. Some even see the English seacoast becoming a new Riviera. The project now appears so attractive that its backers anticipate no major problems in obtaining private financing once the two governments give their approval.

From an engineering standpoint, the project is immense. It appears certain to become one of the landmarks of engineering achievement. Dozens of American engineers and engineering corporations have already participated in the early studies and will probably play major roles in the actual construction of the tunnel. Exactly how the construction will be carried out has not been determined, but it is a possibility that an international company will be set up under treaty between England and France.

The recommendations of the Channel Study Group call for the construction of two parallel one-way tunnels for railway traffic and a smaller service tunnel between



Various methods of construction have been proposed for the English Channel tunnel. One proposal has been made for a bored tunnel through the chalk formation under the seabed. An example of a bored tunnel is shown at the left in a photo of the twin bores cut through the Andes near Caracas, Venezuela, a few years ago. At the right is an example of an immersed tunnel which is constructed by means of prefabricated tunnel sections laid in a trench. The photo is of a section of the tubes laid on the bottom of the Baltimore Harbor to form a four-lane highway tunnel.

them. The traffic tunnels would be twenty-one feet, four inches internal diameter and thirty-two miles long—twenty-three miles of which would be under water. The tunnel would emerge on the English side between Ashford and Folkestone and on the French coast near Calais.

THIS plan would cost something like $300 million and would take about five years to complete. The original hope was to have the tunnel in operation by 1965 or 1966, but this depends greatly on the speed in which the governments of France and England act.

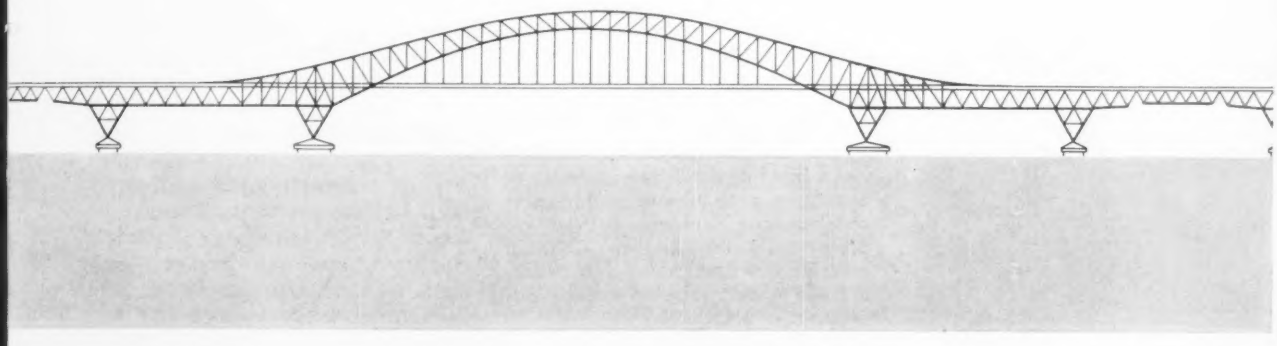
The plan for a railway tunnel, of course, is only one of many plans that have been actively advanced. Proposals have been made for the construction of a bridge, a road tunnel, and a combined road and rail tunnel. All apparently are feasible; the big question is the cost and the anticipated revenue.

In submitting its report, the Channel Study Group estimated that the bridge would cost about $506 million and the combined railway and road tunnel, $563 million. Since revenue would be no greater, the financing of these projects through private groups would be out of the question, the study group said. The road tunnel, costing an estimated $56 million to $120 million more than the railway tunnel, faces similar difficulty.

On the basis of the plans for the railway tunnel, engineers envision that automobiles will be driven directly on special flat cars with the passenger remaining in the vehicles. They will be whipped through the 32-mile long tunnel at fifty-five to sixty miles an hour on trains carrying up to 300 vehicles. Passengers without automobiles will make the trip in convential coaches with train capacities of between 600 and 800 persons traveling at sixty-five miles an hour. Freight trains also will use the tunnel facilities.

The peak capacity of the tunnel, under present plans, will be twelve trains an hour in each direction or one about every five minutes. This capacity will leave an anticipated 100 per cent margin for expansion on estimated traffic figures for 1985 by which time the tunnel is expected to be carrying more than five million persons and 1,196,000 vehicles annually.

Chances of obtaining private financing, of course, depend on



these estimates of traffic and revenue. Supporters of the tunnel project feel that the speed and convenience of the tunnel will siphon much of the traffic from existing routes. This will be supplemented greatly by expected big increases in travel between England and the continent as well as a continued rise in the number of non-European tourists. Shipment of goods—particularly of items needing speedy delivery—also is expected to be a big revenue source for the tunnel, particularly if the European Free Trade Area becomes a reality.

Engineers have proven time and again that bridges can be built over vast expanses of water under adverse weather conditions. One of the prime examples is Mackinac Bridge, designed by Dr. D. B. Steinman. Merritt-Chapman and Scott which constructed the Bridge is one of the engineering companies that has proposed a bridge for the English Channel.

During the first year of the operation, the tunnel is expected to handle more than three million passengers, 676,000 automobiles and 1,230,000 tons of freight. This traffic level is expected to bring in about $36,400,000 in gross receipts. By 1980 it is anticipated that the tunnel will have gross receipts of over $58 million. Under present plans individual fares for the tunnel will be lower than those on existing routes. The tentative charges are $4.48 per passenger; $16.24 per vehicle (with driver), and $5.88 per ton of freight.

Many methods of construction have been devised by engineers to overcome problems of underwater construction, making such huge projects as the English Channel crossing more possible. Here workers use a Sonotube to encase pilings on a bridge.

The average passenger with his $4.48 ticket sitting in an air-conditioned compartment probably will little appreciate the engineering history and effort that will be so much a part of the tunnel. Nevertheless, it is a fascinating story. It is a story of engineers' imagination and determination to make an "impossible" project workable.

Throughout its 150-year history, the project has been beset by a variety of technical, economic and strategic obstacles. British military has often opposed the project for strategic reasons. In the 1800's, British generals were quite concerned that French invaders would come through the tunnel disguised as Sunday excursionists. Even recently, in the midst of the Space Age, military objections have been voiced occasionally, like Field Marshal Viscount Montgomery's comment:

"Strategically it would weaken us. Why give up one of our greatest assets, our island home and make things easier for our enemies? The Channel Tunnel is a wildcat scheme and I am wholeheartedly opposed to it."

But objections of this kind are rapidly fading out and are not considered to be serious obstacles to the project. Backers of the project were particularly encouraged by the fact that the British government interposed no objections when the current plan was submitted.

But these supporters are well aware of the historical background of the project. A half dozen times in the last century the plans have appeared on the verge of fruition, only to be killed off by some last minute objection.

THE project got so far along in the early 1880's that short pilot tunnels were constructed on both coasts. But that work had to be abandoned after the British government, primarily on strategic grounds, ordered the companies to cease operations. Today, more than 2,000 yards of those old tunnels remain and were used to study part of the chalk formation for the current proposals.

The project actually became a serious engineering proposal about a century ago after Thome de Gamond, a French engineer, and Sir John Hawkshaw, a British engineer, published separate plans for a railway tunnel. There were differences of opinion between the two engineers, but their studies resulted in the formation of channel tunnel companies in both countries. These companies were moving rapidly along on the project when the British government issued its order in 1883.

Despite this disappointment, studies and plans continued with engineers like Albert Sartiaux in France and Sir Douglas Fox and Sir Percy Tempest in England leading the way. After World War I, the *conseil superieur* of the French Travaux Publics supported a plan brought forward by Sartiaux, and in 1930 a committee set up by the British government declared itself in favor of a tunnel. But the House of Commons in a 179 to 172 vote killed the plan.

With the automobile becoming more prominent, later plans included proposals for a road tunnel. At least one proposal has been made for a combination tunnel with road traffic on one level and rail traffic on another.

*(Continued on page 62)*

# Professional Profiles

Ed Sylvester (right), a Detroit, Mich., civil engineer, talks over campaign plans with Stanley Fike, executive director of Senator Stuart Symington's presidential campaign.

ED SYLVESTER, JR., P. E., who used to build major waterwork facilities, today is busy building fences —political fences, that is.

Mr. Sylvester, a 36-year-old native of Detroit, Michigan, got into the middle of the 1960 presidential campaign early this year, joining the staff of Senator Stuart Symington as a field representative.

What's an engineer doing in the national political arena?

"I have always felt that engineers should do more to project themselves into community and public life," Mr. Sylvester replies.

As a field representative for Senator Symington, Mr. Sylvester is getting a front row view of the 1960 Democratic campaign. Operating out of the Symington headquarters in Washington, D. C., the former Detroit city engineer flies to points throughout the nation, meeting with local leaders, determining political trends and, in general, helping to shape the campaign.

Mr. Sylvester became interested in politics some years ago and was a member of the 13th Congressional District organization in Detroit before joining the presidential campaign staff. He is also a past president and member of Detroit's Cotillion Club which gained wide recognition for highly successful voter registration drives in that city.

A civil engineering graduate of Wayne University, he joined Detroit's city engineering staff in 1949 as an assistant civil engineer in the Department of Water Supply. In 1951, he was promoted to senior assistant civil engineer of the department and in 1952 became associate civil engineer.

In 1954, he was transferred to the Hydraulic Structural Division where as an associate civil engineer he participated in the design of the Northeast Detroit pumping station and in the expansion of the Springwells pumping station and other enlargements of the city's water system.

He left the city in January, 1958, to become manager and engineer for the Liberian-American A&I Corporation in Liberia, West Africa. Here he supervised a technical staff of seven Americans and 110 local workers in the design and construction of roads, bridges, market development, and sales.

Mr. Sylvester takes seriously the idea of professional men playing important roles in community life. "I think it is important for engineers to improve their over-all public image by participating in public affairs," he says.

In addition to being a member of NSPE, he belongs to the American Society of Civil Engineers and is a charter member and past board member of the Society of Municipal Engineers in Detroit. He is also a past president of the Wayne State University Civil Engineering Alumni Association.

# Report on a Case by the Board of Ethical Review

**The Board of Ethical Review was established to provide service to the membership of the NSPE by rendering impartial opinions pertaining to the interpretation of adopted Canons of Ethics and Statements of Policy regarding professional conduct. The *American Engineer* will print findings on specific cases as they are reported by the BER to the NSPE Board of Directors.**

## Case No. 59-3

**Subject:**

*Preferential treatment of building materials*

*Free engineering*

*Conflict of interest*

**Facts:**

A consulting engineer prepared the following specification for a project:

"The design of members and connections for any portions of the structure not indicated on the drawings shall be completed by the contractor. Such design shall conform to the requirements of the current issue of the Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings of the American Institute of Steel Construction. These design shop drawings shall be submitted for approval, before any material is fabricated. Subsequent to approval, no changes or modifications shall be made by the contractor."

**Questions:**

1. Does the specification indicate preferential treatment and restrictions of free competition among suppliers of building materials?
2. Does the specification encourage or suggest the furnishing of free engineering services by the manufacturer of the building material?
3. Should the consulting engineer do detailing work for contractors (fabricators and material vendors) on the same project for which he is engaged as the consulting engineer?
4. Should the consulting engineer solicit such detailing work on the basis of being the engineering consultant?
5. Should the consulting engineer approve the materials and shop drawings of the fabricator for the project on which he is engaged as the consulting engineer?

**References:**

Canons of Ethics, Section 15—"He will not accept compensation, financial or otherwise, from more than one interested party for the same service, or for service pertaining to the same work, without the consent of all interested parties."

Section 16—"He will not accept commissions or allowances, directly or indirectly, from contractors or other parties dealing with his clients or employer in connection with work for which he is responsible."

Section 18—"(second sentence only) He will not allow an interest in any business to affect his decision regarding engineering work for which he is employed, or which he may be called upon to perform."

Rules of Professional Conduct, Rule 11—"He will not undertake or agree to perform any engineering service on a free basis."

Rule 14—"His plans or specifications will not be such as to limit free competition, except with his client's consent."

Rule 27—"He will not accept financial or other considerations, including free engineering designs, from material or equipment dealers for specifying their product."

**Discussion:**

Questions 1 and 2—It has long been the practice for the designer to omit details of design where these are covered by well-recognized standards and where the details vary widely among the several potential fabricators. If the designer furnishes details based on the shop practice of one fabricator, he automatically gives the latter an advantage. The specifications included by reference in the example are well known and are the recognized technical standard for steel construction. Their use places all fabricators on an equal basis and eliminates the unnecessary expense of preparing detailed drawings of portions of the structure which can be prepared more cheaply and with less confusion by the group responsible for the fabrication. The shop drawings should be subject to review and approval by the consulting engineer, and in such case his client and the public are protected adequately.

The supplier in these cases maintains a staff of technicians for preparing shop drawings and the cost is included in the over-all price of furnishing the material. The preparation of shop drawings does not belong to the type of engineering service contemplated in Rule 11. The use of standard specifications which allow a great number of companies to bid on a project complies with the statement of Rule 14 and does not conflict with the letter or the spirit of Rule 27.

The question remains, however, as to the propriety of specifying one type of product over another. It is the duty of the consulting engineer to decide that a particular project is best served by the choice of certain materials in certain places. The specification in the example eliminates the use of wood, reinforced concrete, or masonry, and it is in the best interests of all concerned that the engineer make the decision as to the basic material before designing the project. Rule 14 should not be interpreted to eliminate such de-

*(Continued on page 60)*

Engineers and public health officials are showing increasing concern over the amount of waste that is being dumped into the nation's streams and lakes. Not all cases of pollution can be as easily spotted as these three examples. Many times pollution takes more subtle forms and goes unnoticed until streams become smelly health hazards.

# POLLUTION— DESTROYER AT WORK!

***The Engineer No Longer Stands Alone in His Battle against This National Disaster— The Public Now Joins with Him***

For years Americans have turned on the faucets in their homes with complete confidence of receiving a safe, clean water supply.

Today, that confidence is being shaken by the realization that the nation has fallen far behind in controlling pollution of its streams and lakes.

Some startling revelations—like the discovery that nematodes, a small wriggling worm existed in ordinary tap water—have jolted the public into real concern about a problem which many sanitary engineers consider the nation's number one conservation and health challenge of the day.

Pollution can destroy water supplies just as effectively as a prolonged drought. It has already demonstrated that it can wipe out sources of drinking and industrial water as well as eliminate prime recreational areas of the nation.

Evidences of pollution dot the country. The historic Potomac River is a smelly example right under the noses of the nation's congressmen. Every summer, beaches on the Great Lakes are closed because of high bacteria counts. Portions of the Delaware River have become so polluted that public health officals term it impractical as a source for water supply. The examples go on and on, reminders of expensive neglect.

Professional engineers and health officials long have recognized the growing dangers of pollution, but only recently has the public, and more particularly the politicians, become actively interested in the problem. Now, thanks to dramatization of the conditions, the sanitary engineer appears on the way to receiving support which many feel is long overdue.

America can either have clean recreational spots like this beach at the left or dirty unusable water shown in the photograph above.

The problem of pollution, like most of our natural resources issues, has become increasingly complex as the nation has grown in population and industrialization. Concentrations of population in urban areas have severely taxed treatment facilities as well as the ability of the streams to assimilate the wastes. New industrial wastes such as chemicals, and even the common household detergent, have created additional problems in an already bad situation.

Congress got a simple and direct summation of the problem in a recent report submitted by Arnold B. Kurlander, acting surgeon-general of the Public Health Service:

"We have been caught unaware . . . by the huge demands for water resulting from rapid population and economic growth, and are relatively unprepared sociologically, economically, legally or technically to handle them. We have oversold the cheapness and plentifulness of water and failed to emphasize the necessity and value of pollution control. We are attempting to manage the new, complex problems of today with tools that were designed for the problems of yesterday."

At least part of the problem has been in awakening the public to the menace of pollution. The average person is quite content as long as he is able to turn on his faucet and get good water or as long as his favorite fishing spot is untouched. It is only when the fish start dying or the stream begins to give off an unpleasant odor that he becomes concerned. By that time the stream is already heavily polluted and the necessary improvements are certain to be expensive. Health officials not only hope such streams can be cleaned up, but also that programs can be put into effect which will prevent pollution from ever reaching this stage of development.

Increasing publicity about pollution as well as some startling discoveries by health officials have served to dispel some of the public's apathy in recent years. Rep. John Blatnik of Minnesota, a leader in the fight for pollution control, recently revealed that the Public Health Service had turned up microscopic worms in some of the water supplies of the nation's major cities, a fact calculated to make even the most apathetic citizen concerned.

These worms, known as nematodes, are not dangerous in themselves, Rep. Blatnik says, but they feed on virus-type germs. "The danger is this: While the germs can ordinarily be killed by chlorination the worms cannot; germ carrying nematodes in our water constitute a definite health hazard."

AN example of the publicity spotlight that is being put on pollution is an article "Danger in Your Drinking Water," written by Alvin Toffler in *Good Housekeeping* magazine. One of the graphic case studies cited by the article was this account of what pollution meant to a Denver suburb:

"In November, 1958, residents of a Denver suburb jammed the offices of the Baker Water and Sanitation District with bitter complaints about the 'dirty rotten water' they had been getting. Their tapwater, milky and swamp smelling, originated in a creek into which six other communities fed raw sewage. When the creek was at low flow the Baker plant had to process 100 percent undiluted sewage. In January, 1959, health officials in the Baker district completed a door-to-door survey. The results showed that customers in the district had suffered twice as much intestinal illness as a similar group in another water district. The survey forced a temporary changeover to well water. But many Baker district residents refused to drink their tapwater anyway. A housewife was quoted as saying, 'I don't even bathe my children in it until I add a goodly amount of bubble bath. Sometimes the water is dirtier than the kids.' Other Baker district residents were buying distilled water by the case for drinking and cooking."

Not all pollution problems are as

serious or as dramatic, but they are certainly not isolated. The Hoover Commission Task Force on Water pointed up the widespread nature of the problem. At the time of the report in 1955, the Task Force estimated that eighty-five million persons were dependent for their drinking water upon surface waters subject to pollution. The report said that in more populous areas such as the upper Ohio watershed during periods of low river discharge, one quart of every gallon of water has been flushed through a sewer.

It is evident that pollution is being recognized as a real problem. True, not everyone is in agreement on approaches to the problem, but at least there is unanimous agreement that pollution is bad. The big question remaining is: What can be done to stop pollution?

The big answers to the problem undoubtedly are research and more (and better) treatment plants.

Sanitary engineers trying desperately to keep apace with existing problems constantly are finding new ones being tossed on their desks. New chemicals, new insecticides, new detergents, new industrial wastes are creating new problems for treatment systems designed for conventional wastes. Additional research to meet these and other pollution problems apparently is badly needed.

The PHS particularly believes that new methods of treatment must be discovered which will remove more of the contaminants from municipal wastes. Present treatment methods are estimated to remove only seventy-five to ninety per cent, each, of the suspended solids and biochemical oxygen demand (called BOD) in domestic sewage. Little of the total nitrogen and phosphorous is removed.

"Because of these deficiencies," the PHS says, "large quantities of water must be available to dilute and transport the residual wastes after treatment of sewage and when it is not available, serious pollution problems result.

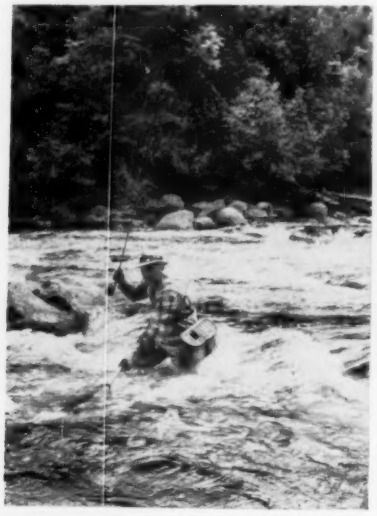
"Unless new methods of treatment are discovered, the volume strength and complexity of future municipal wastes can only result in the discharge of larger and larger amounts of impurities into badly needed water resources."

The Public Health Service cites Chicago as an example of a city that still has problems despite modern treatment facilities. The city, according to the PHS, pours into the Illinois Waterway waste waters which have pollution effects equivalent to the discharge of sewage from about one million persons and contains solids—natural and synthetic, organic and mineral —that amount to about 1,800 tons a day.

Until recently, scientific pollution research was receiving less than $1 million a year. The total figure has now risen to something like $6 million (Federal, industrial and state sources), but many still consider this exceedingly small in view of the large backlog of unsolved pollution problems.

These are some of the areas where the PHS believes the research money could be used:

- **Methods for detecting, isolating, identifying and measuring new contaminants.**
- **Physiological and toxicological effects of new contaminants on humans as well as fish and wildlife.**
- **Effectiveness of water and waste treatment methods on these new contaminants with development of new methods where necessary.**
- **Behavior and fate of various contaminants in water environment.**
- **Over-all coordination of related research by Federal, state university, and other laboratories.**
- **Orientation of research toward possible utilization of waste products.**
- **Development of new means of waste monitoring.**
- **Determination of the nature, peculiarities, types and effects of ground-water pollution with emphasis on methods of control.**
- **Development of economical methods for the ultracleansing of waste water.**
- **Review and improvement of present methods of water quality measurements such as the BOD—dissolved oxygen relationship.**
- **Determination of possible epidemiological effects of pollution. Even more vital, many believe, is the construction of new**



In the photograph below, the water is so grossly polluted that gas bubbles are rising to the surface, but brighter views are shown in the photos at left and right where water resources still are providing maximum benefit for their users.

**treatment plants just to catch up with the backlog. The Public Health Service says that nearly 2,-900 new sewage treatment works are needed to serve 19.5 million persons living in communities that have never provided treatment for their wastes. Until this minimum amount is accomplished, it is obvious, untreated wastes will continue to float down our streams.**

served by sewage treatment facilities.

If municipalities are to catch up with treatment needs by 1965, they will have to spend $1.9 billion to eliminate the backlog, $1.8 billion to provide for new population growth, and $900 million to replace plants that become obsolete, according to figures compiled by PHS.

Modern treatment facilities like this plant can do much to prevent pollution of streams. Engineering advances make it possible for sewerage plants to be located in residential areas without creating any problem of odor.

The PHS also estimates that 1,-100 new plants are needed for 3.4 million persons in communities where treatment works built in the past have become overloaded or obsolete. In addition to these 4,000 communities needing new plants, another 1,630 communities have sewage treatment facilities requiring enlargement or the addition of new units to adequately serve populations totaling more than twenty-five million, the PHS says.

The PHS claims that the only time construction of sewage treatment facilities kept up with sewer construction in this country was during the Federal Public Works program of the 1930's. Before that time—and since—the number of persons served by sewers increased more rapidly than the number

Construction of facilities for industrial wastes also are woefully behind. The PHS, in a report to the Senate Select Committee on Water Resources, says that construction of industrial waste treatment facilities has never kept up with the increase in the number of industrial sewer outlets nor the increase in the production of wastes. The PHS estimates that more than 6,000 construction projects are needed for industrial wastes at a cost about equal to that for municipal facilities.

If they are to meet these requirements, it is plain that municipalities across the country face a big financial burden. There has been a great deal of controversy over how much the Federal Government should participate in the effort to end the nation's pollution problem. This year, President Eisenhower vetoed a water pollution bill which would have provided $90 million annually for ten years to help local authorities in building new treatment plants. The President had asked for a bill providing $20 million, less than half of what had been authorized annually for the past three years. Mr. Eisenhower essentially argued that pollution control was a local problem and contended that Federal funds would discourage local communities in initiating projects.

Rep. Blatnik and other supporters of the bill argued that the program put into effect in 1956 had greatly stimulated local spending for pollution control and estimated that local communities had put up $4.70 for every $1 received from the Federal Government under the act.

The veto by President Eisenhower appears certain to be a political issue this fall and probably will serve to further dramatize the pollution problem.

Actually, the Federal Government first got into the water pollution picture as early as 1886 when Congress passed an act forbidding the deposit of refuse matter in New York Harbor because of danger to navigation. It was later, after the work of Pasteur, Koch and Lister, that polluted water became recognized as a health menace and carrier of such diseases as typhoid and cholera. The Federal Government has slowly expanded its efforts in the pollution field.

The present Water Pollution Act is an outgrowth of a bill sponsored by Senators Barkley and Taft in 1948 providing loans and grants for treatment facilities. The Act was extended in 1952 and the present law was enacted in 1956.

Engineers have always been closely identified with the development of the nation's natural resources. In the field of water, they have been more often associated with huge water conservation and development projects. These are still vitally important, but the engineer may now be called upon to use his talents to save the water we already have through pollution control.—**End.**

## Views of Membership . . .

# Results of Poll on Organization Of the Engineering Profession

NSPE members are well aware of the extensive considerations given by the Society and other groups as to the appropriate organization of the engineering profession to accomplish the various objectives desired by individual members of the profession. There are two basic schools of thought in the engineering profession. The first is that more effectiveness can be accomplished if a mechanism can be found for creating an umbrella over the existing engineering societies; and the second is that to accomplish the professional objectives of individual engineers an organization based on individual membership and effective at local and state as well as national levels is necessary. Organizations of both types now exist in the engineering profession —the federation of existing societies represented by the Engineers Joint Council, and the three-level individual membership organization represented by the National Society of Professional Engineers.

NSPE has repeatedly taken the position that any effort to more effectively organize the profession will be only as successful as it is supported and endorsed by individual engineers. With this in mind, NSPE has over the past fifteen years endeavored to inform its membership of the various considerations involved in the discussions to date. So deeply entrenched in the philosophy of NSPE is the idea that its policies should reflect the wishes of individual members, it was felt essential that the membership of NSPE be given the opportunity to express itself on a number of basic elements of the current considerations of the organization of the engineering profession. It will be recalled that the Inter-Society Relations Committee recommended to the NSPE Board, and the Board approved, the sending of a questionnaire to all members of the Society asking pertinent questions pertaining to this important subject.

Prior to the sending of the questionnaire, the Committee and Board felt it was essential that opportunity be given for chapter discussion and a suitable digest of the material presented at chapter meetings be carried in the AMERICAN ENGINEER such that those members who did not have the privilege of attending a particular chapter meeting might have the same information. It will be recalled that the Inter-Society Relations Committee prepared and distributed early in 1959 an extensive kit outlining the past history of the organization of the engineering profession, brief outlines of the organization of the medical and legal professions, a presentation in some detail of the proposal of the American Institute of Electrical Engineers for a functional organization of the engineering profession, and a review of the reports and policy decisions of NSPE with respect to this question. Subsequently, this material was digested in a 12-page insert in the January, 1960, issue of the AMERICAN ENGINEER.

In the latter part of January a questionnaire was distributed to all members of NSPE asking fifteen questions with two additional identification questions by which a determination might be made of the cross-section of response from members of the Society. A great deal of thought went into the preparation of this questionnaire.

It should be emphasized at this point that NSPE's concern is primarily for the organization of the profession as it concerns professional matters. It has always taken the position that the technical societies are well organized and doing a most complete job in the expansion and dissemination of technical information. It has felt that the Engineers' Council for Professional Development is serving well the needs of the profession with respect to engineering education. The discussions, therefore, of the last fifteen years have been primarily concerned as to the organization of the engineering profession for effectiveness in developing the professional aspects of engineering.

### Areas of Inquiry

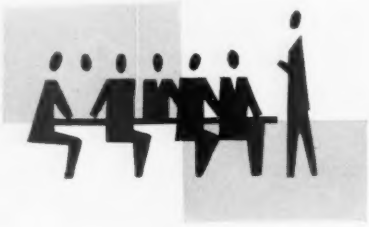
The Society in all of these discussions has consistently presented three elements it feels are essential for effective organization of the engineering profession for professional matters. The Committee felt it is essential to secure an indication of the extent to which the membership endorsed the three basic principles the Society has enunciated so consistently in these unity discussions. The first three questions of the questionnaire, therefore, ask the opinion of the member as to whether or not these elements are essential in the organization of the profession to be effective in the professional matters concerning all engineers. Some comment has been received by the Committee that members were led to support these principles by the statement of the position of the Society which preceded the asking of the questions. The Committee debated for some time whether or not the statement of the Society's position should be presented at this point in the questionnaire and was faced with the obvious problem that only a portion of the membership would have attended a chapter meeting or read the January issue of the magazine. It was felt that the membership should have the Society's principles stated and then be given an opportunity to subscribe to these principles or to indicate their opposition thereto.

The next area of concern of the Committee was to determine how extensively the membership was informed on the three elements of coordination proposed by the AIEE in the Functional Plan. Questions 4, 5, and 6, therefore, were an attempt to determine how well informed the membership is on the Engineers Joint Council, the Engineers' Council for Professional Development, and the Functional Plan itself.

Questions 7, 8 and 9 were directed specifically to the member's opinion of the Functional Plan—Question 7 giving him an opportunity to indicate whether or not he feels this Plan is an effective first step in improving the organization of the engineering profession, Question 8 asking whether or not he feels a coordinating body would improve the proposal, and Question 9 giving him the specific alternatives he prefers for organization of the engineering profession at this time.

Since it has been suggested at various times through the discussions of the past several years that NSPE should join both EJC and ECPD, Questions 10 and 11 were presented for an opportunity for the member to express his opinion on this subject.

The AIEE in proposing the Functional Plan suggested as a separate and additional matter that NSPE should investigate the possibility of extending its membership to nonregistered members of the profession. There are, of course, a number of ways in which this could be done; and the remaining questions of the questionnaire endeavor to present in concise fashion several alternatives with an opportunity for the member to express his preferences.



The two remaining questions were the ones previously referred to as identification questions—the opportunity for the member to indicate his membership in other societies of the profession, and to indicate the geographical spread of the voting through the member state societies.

### Committee Observations

The Committee pointed out several items with respect to this questionnaire:

(1) It is not intended that this survey in any way foreclose further discussion between NSPE and any other groups of the engineering profession interested in more effective organization of the profession.

(2) The survey was intended and should be considered as an opinion poll of the desires of the members of NSPE for information in further activities and discussions.

(3) While it is believed that the returns reflect the opinions of a good cross-section of both NSPE and the engineering profession, it should be recognized as the composite of the response of some 13,000 members of the profession and NSPE and must be viewed in terms of the specific questions asked. Care should be exercised in drawing extensive generalizations or conclusions from the returns received.

### Extent of Returns

There were 13,024 returns received from members by the middle of March when it was necessary to cut off the questionnaire returns in order that tabulations could be made and a report presented to the Board. Of these returns, 112 were returned either without answering the questions, with essay type comments, or with qualified answers such that they could not be tabulated with the others. The results, therefore, are based on 12,912 returns. Hugh Rusch, vice president of Opinion Research, Inc., in commenting on polls of this kind conducted by a single mailing of a questionnaire said: "Direct mail advertising consider a return of 4 or 5 per cent very good. Any opinion questionnaire mailed to a group with known interest in the subject being considered will, however, result in a higher return, 20 to 25 per cent being considered a good response." The return on this questionnaire was 28 per cent.

### Reaction to Society Position

Reference to Tables 1, 2, and 3 indicates 9 out of 10 of those replying believe the most effective organization for professional development should be a three-level organization based on individual membership. More than 95 out of 100 of those replying believe the organization should be limited to qualified engineers, and better than 8 out of 10 believe the basis for qualification should be registration as a profession engineer or an EIT.

*Table 1.* "Should this organization be so established that democratic representation and individual membership extend from local chapter to state society, and state society to national society?"

| Replies | No. | Per Cent |
|---|---|---|
| Yes | 11,681 | 90.5 |
| No | 373 | 2.9 |
| No Opinion | 568 | 4.4 |
| No Answer | 290 | 2.2 |
| Total | 12,912 | 100.0 |

*Table 2.* "Should this organization be limited to individuals who are qualified engineers?"

| Replies | No. | Per Cent |
|---|---|---|
| Yes | 12,327 | 95.5 |
| No | 336 | 2.6 |
| No Opinion | 69 | 0.5 |
| No Answer | 180 | 1.4 |
| Total | 12,912 | 100.0 |

*Table 3.* "Should the basis for qualification be limited to those registered as EIT's or PE's under the laws of the various states or territories?"

| Replies | No. | Per Cent |
|---|---|---|
| Yes | 10,558 | 81.8 |
| No | 1,799 | 13.9 |
| No Opinion | 231 | 1.8 |
| No Answer | 324 | 2.5 |
| Total | 12,912 | 100.0 |

### Familiarity with Functional Plan

Table 4 indicates that 2 out of 3 of those replying to the questionnaire were familiar with the Plan proposed by the AIEE. These were about evenly divided between those who had considered the Plan in detail and those who had heard reference to it but were not familiar with the details. Despite the publicity, chapter meetings, and discussion in engineering circles concerning the Functional Plan, still 1 out of 3 of those replying were not familiar with the Plan.

### Familiarity with EJC

Table 5 indicates that less than 3 out of 100 had participated in any activities of the Engineers Joint Council, although 4 out of 10 were familiar with the EJC in some detail. While less than 1 in 5 replied that they were not familiar at all with EJC, nearly 3 out of every 5 replying to the questionnaire indicated they were not familiar with the details of the Engineers Joint Council.

### Familiarity with ECPD

While a slightly higher percentage of those replying have participated in the ECPD activities as contrasted to participation in the EJC activities, it was still only slightly over 3 out of every 100. Table 6 will show that about 1 in 3 of those replying to the questionnaire were familiar with some details of ECPD, but more than 6 out of 10 were either not familiar with the details or completely unfamiliar with the activities of ECPD.

### Reaction to Functional Plan

Table 7 indicates a high degree of support from the respondents to the questionnaire for the AIEE Functional Plan. More than 3 out of 4 of those replying believe that such a Plan would be a desirable step in improving the organization of the engineering profession.

*Table 7.* "Do you believe that a plan to have EJC coordinate technical matters, ECPD coordinate educational matters, and NSPE coordinate professional matters (the AIEE Functional Plan) would be a desirable first step in improving the organization of the engineering profession?"

| Replies | No. | Per Cent |
|---|---|---|
| Yes | 10,015 | 77.6 |
| No | 1,067 | 8.3 |
| No Opinion | 1,606 | 12.4 |
| No Answer | 224 | 1.7 |
| Total | 12,912 | 100.0 |

### Familiarity vs. Reaction

A cross-tabulation was made of the answers to Question 7 in terms of the familiarity of the respondents with the Functional Plan itself. Reference to Table 8 will show that those opposing such a Plan as a first step in improving the organization of the engineering profession remain approximately the same percentage independent of their familiarity with the Plan. However, those feeling this Plan to be desirable increased

*Table 4.* "How familiar are you with the Functional Plan proposed by the AIEE? (CHECK ONLY ONE ANSWER)."

| Replies | No. | Per Cent |
|---|---|---|
| Read and considered it in detail | 4,094 | 31.7 |
| Heard reference to it in engineering circles but am not familiar with the details | 4,319 | 33.5 |
| Am not familiar with the Plan | 4,266 | 33.0 |
| No Answer | 233 | 1.8 |
| Total | 12,912 | 100.0 |

*Table 5.* "How familiar are you with the Engineers Joint Council (EJC)? (CHECK ONLY ONE ANSWER)."

| Replies | No. | Per Cent |
|---|---|---|
| Have participated in its activities | 303 | 2.3 |
| Am familiar with it in some detail | 5,145 | 39.8 |
| Am not familiar with the details | 5,082 | 39.4 |
| Am not familiar with it | 2,295 | 17.8 |
| No Answer | 87 | 0.7 |
| Total | 12,912 | 100.0 |

*Table 6.* "How familiar are you with the Engineers' Council for Professional Development (ECPD)? (CHECK ONLY ONE ANSWER)."

| Replies | No. | Per Cent |
|---|---|---|
| Have participated in its activities | 428 | 3.3 |
| Am familiar with it in some details | 4,479 | 34.7 |
| Am not familiar with the details | 4,880 | 37.8 |
| Am not familiar with it | 3,028 | 23.4 |
| No Answer | 97 | 0.8 |
| Total | 12,912 | 100.0 |

*Table 8.* Answers to Question 7, according to degree of familiarity with Functional Plan (Q. 4).

| Answer to Question 7 | All Respondents | | Answer to Question 4 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Very Familiar (1) | | Somewhat Familiar (2) | | Not Familiar (3) | | NA to Question 4 | |
| | No. | Per Cent | No. | Per Cent | No. | Per Cent | No. | Per Cent | No. | Per Cent |
| Yes | 10,015 | 77.6 | 3,654 | 89.3 | 3,396 | 78.6 | 2,817 | 66.0 | 148 | 63.5 |
| No | 1,067 | 8.3 | 328 | 8.0 | 386 | 8.9 | 336 | 7.9 | 17 | 7.3 |
| No Opinion | 1,606 | 12.4 | 80 | 2.0 | 471 | 10.9 | 1,020 | 23.9 | 35 | 15.0 |
| No Answer | 224 | 1.7 | 32 | 0.7 | 66 | 1.6 | 93 | 2.2 | 33 | 14.2 |
| Total | 12,912 | 100.0 | 4,094 | 100.0 | 4,319 | 100.0 | 4,266 | 100.0 | 233 | 100.0 |

from approximately 2 out of 3 of those not familiar with the Plan to 9 out of 10 who responded as being very familiar with the Plan. The principle variation in these tabulations occurred with a high percentage having no opinion if not familiar with the Plan, whereas a comparatively low percentage have no opinion if familiar with the Plan. (See Table 8)

### Would Coordinating Body Improve

Table 9 indicates about 7 out of 10 of those replying felt a coordinating body of representatives from ECPD, EJC and NSPE would improve the Functional Plan.

*Table 9.* "Do you feel a coordinating body of representatives from ECPD, EJC, and NSPE would improve this proposal?"

| Replies | No. | Per Cent |
|---|---|---|
| Yes | 8,954 | 69.3 |
| No | 1,523 | 11.8 |
| No Opinion | 2,020 | 15.7 |
| No Answer | 415 | 3.2 |
| Total | 12,912 | 100.0 |

### Familiarity vs. Reaction

While there was some variation in the percentages which felt a coordinating body would improve the Functional Plan according to their familiarity with the Plan, these percentages did not form any pattern except in one respect—that the more familiar the respondents were with the Functional Plan the more they felt there would be no advantage to the coordinating body, as evidenced by the increasing percentage who answered "no" to this question. Again, the less familiar the respondents were with the Plan the higher percentage had no opinion as to the value of the coordinating body. (See Table 10)

### Preference of Current Proposals

Reference to Table 11 indicates the response of those sending in their questionnaires to select one of three alternatives as the most effective plan for the organization of the engineering profession at this time. Two out of 3 favored the Functional Plan, and nearly 1 out of 2 felt that the Functional Plan with the coordinating body to be the preferable choice of the three presented. Only 1 in 5 felt a federation of engineering societies, such as Engineers Joint Council, best.

### Familiarity vs. Preference

Reference to Table 12 shows answers according to familiarity with the Functional Plan. While more than 8 out of 10 of those very familiar with the Plan felt it most desirable, less than 1 in 2 of those not familiar felt it most desirable. Of those familiar with the Plan, more than 1 out of 2 felt the coordinating body would be preferable; while about 1 in 3 of those not familiar with the Plan felt this preferable. Of those familiar with the Plan, less than 1 in 10 felt the federation of societies most desirable; while of those not familiar with the Plan, more than 3 out of 10 felt this best. Of those not familiar with the Plan, nearly 1 in 4 did not have a preference; while only 1 in 20 of those familiar with the Plan had no preference. (See Table 12)

*Table 11.* "What do you think would be the most effective plan for the organization of the engineering profession at this time? (CHECK ONLY ONE ANSWER)."

| Replies | No. | Per Cent |
|---|---|---|
| Functional Plan, as outlined in 7 | 2,477 | 19.2 |
| Functional Plan, with coordinating body, as outlined in 8 | 6,008 | 46.5 |
| Federation of engineering societies at the national level such as Engineers Joint Council | 2,552 | 19.8 |
| No Answer | 1,875 | 14.5 |
| Total | 12,912 | 100.0 |

*Table 10.* Answers to Question 8, according to degree of familiarity with Functional Plan (Q. 4).

| Answers to Question 8 | All Respondents | | Answers to Question 4 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Very Familiar (1) | | Somewhat Familiar (2) | | Not Familiar (3) | | NA to Question 4 | |
| Replies | No. | Per Cent | No. | Per Cent | No. | Per Cent | No. | Per Cent | No. | Per Cent |
| Yes | 8,954 | 69.3 | 2,862 | 69.9 | 3,147 | 72.9 | 2,803 | 65.7 | 142 | 61.0 |
| No | 1,523 | 11.8 | 763 | 18.6 | 424 | 9.8 | 307 | 7.2 | 29 | 12.4 |
| No Opinion | 2,020 | 15.7 | 363 | 8.9 | 627 | 14.5 | 1,001 | 23.5 | 29 | 12.4 |
| No Answer | 415 | 3.2 | 106 | 2.6 | 121 | 2.8 | 155 | 3.6 | 33 | 14.2 |
| Total | 12,912 | 100.0 | 4,094 | 100.0 | 4,319 | 100.0 | 4,266 | 100.0 | 233 | 100.0 |

*Table 12.* Answers to Question 9, according to degree of familiarity with Functional Plan (Q. 4).

| Answers to Question 8 | All Respondents | | Answer to Question 4 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Very Familiar (1) | | Somewhat Familiar (2) | | Not Familiar (3) | | NA to Question 4 | |
| | No. | Per Cent | No. | Per Cent | No. | Per Cent | No. | Per Cent | No. | Per Cent |
| 1. Functional Plan | 2,477 | 19.2 | 1,254 | 30.6 | 716 | 16.6 | 458 | 10.7 | 49 | 21.0 |
| 2. Functional Plan with coordinating body | 6,008 | 46.5 | 2,205 | 53.9 | 2,196 | 50.8 | 1,523 | 35.7 | 84 | 36.1 |
| 3. Federation | 2,552 | 19.8 | 399 | 9.7 | 852 | 19.7 | 1,261 | 29.6 | 40 | 17.2 |
| No Answer | 1,875 | 14.5 | 236 | 5.8 | 555 | 12.9 | 1,024 | 24.0 | 60 | 25.7 |
| Total | 12,912 | 100.0 | 4,094 | 100.0 | 4,319 | 100.0 | 4,266 | 100.0 | 233 | 100.0 |

### Should NSPE Join EJC?

Table 13 shows the response to the question of whether NSPE should join EJC instead of supporting the Functional Plan. Only about 1 in 8 of those responding thought NSPE should join EJC. However, more than 1 in 5 of those responding had no opinion on this question. More than 6 out of 10, however, felt NSPE should not join EJC instead of supporting the Functional Plan.

*Table 13.* "Do you feel NSPE should join EJC instead of supporting the Functional Plan?"

| Replies | No. | Per Cent |
|---|---|---|
| Yes | 1,611 | 12.5 |
| No | 7,985 | 61.8 |
| No Opinion | 2,690 | 20.8 |
| No Answer | 626 | 4.9 |
| Total | 12,912 | 100.0 |

### Familiarity vs. Joining EJC

Again, Table 14 showed considerable variation in the answer to this question according to familiarity with the Function Plan. While 15 per cent of those not familiar with the Functional Plan thought NSPE should join EJC, less than 9 per cent of those familiar with the Plan thought the same. Of those familiar with the Plan, 84 per cent thought NSPE should not join EJC; while only 41 per cent of those not familiar with the Plan were of the same opinion. The percentage of no opinions in this cross-tabulation varies inversely with the degree of familiarity with the Plan.

### Should NSPE be Member ECPD?

With respect to membership of NSPE in ECPD (See Table 15), more than 1 in 4 of the respondents felt NSPE should join ECPD. Nearly 4 out of 10 felt they should not, and about 1 in 4 had no opinion.

*Table 15.* "Do you feel NSPE should be a member of ECPD?"

| Replies | No. | Per Cent |
|---|---|---|
| Yes | 3,556 | 27.5 |
| No | 5,130 | 39.7 |
| No Opinion | 3,418 | 26.5 |
| No Answer | 808 | 6.3 |
| Total | 12,912 | 100.0 |

### Familiarity vs. Membership ECPD

Again, familiarity with the Functional Plan caused considerable difference in the answers to this question (See Table 16), although approximately the same percentages felt NSPE should join ECPD whether or not they were familiar with the Functional Plan. Only 1 in 4 not familiar with the Plan felt NSPE should not join, whereas better than 1 in 2 of those familiar with the Plan felt NSPE should not be a part of ECPD. Again, those having no opinion were a much higher percentage of those not familiar with the Plan than those who were familiar with it.

### Nonregistered Membership

Reference to Table 17 indicates the distribution of the respondents with respect to the question of whether or not NSPE should admit to its membership qualified but nonregistered engineers. Of those responding, 2 out of 3 felt that nonregistered engineers should not be admitted at any level of the three-level Society. Slightly over 1 in 10 thought they should be admitted at all three levels; about 1 in 7 at the local level only; slightly less than 1 in 20 at the local and state levels only. Only slightly over 1 per cent of the respondents had no answer to this question.

### Familiarity vs. Admitting Nonregistered Members

Reference to Table 18 will show again some variations in the response to the question of admit-

*Table 14.* Answer to Question 10, according to degree of familiarity with Functional Plan (Q. 4).

| Answers to Q. 10 (Should NSPE join EJC instead of Functional Plan?) Replies | All Respondents | | Answer to Question 4 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Very Familiar (1) | | Somewhat Familiar (2) | | Not Familiar (3) | | NA to Question 4 | |
| | No. | Per Cent | No. | Per Cent | No. | Per Cent | No. | Per Cent | No. | Per Cent |
| Yes | 1,611 | 12.5 | 366 | 8.9 | 572 | 13.3 | 642 | 15.0 | 31 | 13.3 |
| No | 7,985 | 61.8 | 3,438 | 84.0 | 2,666 | 61.7 | 1,760 | 41.3 | 121 | 51.9 |
| No Opinion | 2,690 | 20.8 | 199 | 4.9 | 886 | 20.5 | 1,567 | 36.7 | 38 | 16.3 |
| No Answer | 626 | 4.9 | 91 | 2.2 | 195 | 4.5 | 297 | 7.0 | 43 | 18.5 |
| Total | 12,912 | 100.0 | 4,094 | 100.0 | 4,319 | 100.0 | 4,266 | 100.0 | 233 | 100.0 |

ting nonregistered membership according to familiarity with the Functional Plan. A higher percentage of those familiar with the Plan were willing to accept nonregistered members than those not familiar with the Plan. Nevertheless, almost 6 out of 10 of those familiar with the Plan did not feel NSPE should accept nonregistered members at any level of the Society.

### Who to Admit

Table 19 was tabulated only for those who in answer to the previous question had indicated NSPE should accept nonregistered members at some level of the Society. Of those willing to accept members other than those registered professional engineers, 1 out of 2 felt this should be left to the board of directors of the state society or local chapter to determine if the applicant had qualifications equivalent to the requirements for registration in that state. One in 10 would restrict it to members and fellows of the founder societies; 1 in 5 would permit members and fellows of any technical society having ECPD recommended qualifications, and another 1 in 5 would accept any graduate of an accredited engineering curricula.

*Table 16.* Answers to Question 11, according to degree of familiarity with Functional Plan (Q. 4).

| Answer to Question 11 (Should NSPE be a member of ECPD?) | | | Answers to Question 4 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | All Respondents | | Very Familiar (1) | | Somewhat Familiar (2) | | Not Familiar (3) | | NA to Question 4 | |
| Replies | No. | Per Cent | No. | Per Cent | No. | Per Cent | No. | Per Cent | No. | Per Cent |
| Yes | 3,556 | 27.5 | 1,093 | 26.7 | 1,247 | 28.9 | 1,160 | 27.2 | 56 | 24.0 |
| No | 5,130 | 39.7 | 2,295 | 56.1 | 1,625 | 37.6 | 1,124 | 26.3 | 86 | 36.9 |
| No Opinion | 3,418 | 26.5 | 563 | 13.7 | 1,166 | 27.0 | 1,640 | 38.5 | 49 | 21.1 |
| No Answer | 808 | 6.3 | 143 | 3.5 | 281 | 6.5 | 342 | 8.0 | 42 | 18.0 |
| Total | 12,912 | 100.0 | 4,094 | 100.0 | 4,319 | 100.0 | 4,266 | 100.0 | 233 | 100.0 |

*Table 17.* "Should NSPE admit to its membership qualified but nonregistered engineers? (CHECK ONLY ONE ANSWER)."

| Replies | No. | Per Cent |
|---|---|---|
| At the local, state and national levels | 1,496 | 11.6 |
| At local and state levels only | 773 | 6.0 |
| At local level only | 1,939 | 15.0 |
| Not at any level | 8,534 | 66.1 |
| No Answer | 170 | 1.3 |
| Total | 12,912 | 100.0 |

*Table 18.* Answers to Question 12, according to degree of familiarity with Functional Plan (Q. 4).

| Answer to Question 12 (Should NSPE admit nonregistered engineers) | | | Answers to Question 4 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | All Respondents | | Very Familiar (1) | | Somewhat Familiar (2) | | Not Familiar (3) | | NA to Question 4 | |
| Replies | No. | Per Cent | No. | Per Cent | No. | Per Cent | No. | Per Cent | No. | Per Cent |
| At local, state and national levels | 1,496 | 11.6 | 687 | 16.8 | 384 | 8.9 | 401 | 9.4 | 24 | 10.3 |
| At local and state levels | 773 | 6.0 | 357 | 8.7 | 216 | 5.0 | 189 | 4.4 | 11 | 4.7 |
| At local level | 1,939 | 15.0 | 681 | 16.6 | 664 | 15.4 | 574 | 13.5 | 20 | 8.6 |
| Not at any level | 8,534 | 66.1 | 2,341 | 57.2 | 3,008 | 69.6 | 3,022 | 70.8 | 163 | 70.0 |
| No Answer | 170 | 1.3 | 28 | 0.7 | 47 | 1.1 | 80 | 1.9 | 15 | 6.4 |
| Total | 12,912 | 100.0 | 4,094 | 100.0 | 4,319 | 100.0 | 4,266 | 100.0 | 233 | 100.0 |

*Table 19.* "Should such additional membership be limited to: (CHECK ONLY ONE ANSWER)."

| Replies | No. | Per Cent |
|---|---|---|
| Members and fellows of the founder societies | 411 | 9.8 |
| Members or fellows of any technical society having ECPD-recommended qualifications for these grades | 819 | 19.5 |
| If in the opinion of the board of directors of a state society or local chapter the engineer has qualifications equivalent to requirements for registration in that state | 2,112 | 50.2 |
| Any graduate of an accredited engineering curricular | 758 | 18.0 |
| No Answer | 108 | 2.5 |
| Total* | 4,208 | 100.0 |

* Only engineers who selected answers 1, 2, or 3 to question 12 (thereby accepting to some level of NSPE membership nonregistered engineers) were asked to answer this question.

### If Admitted, at What Levels?

Reference to Table 20 will indicate that there was some variation in these qualifications depending upon whether the respondents felt nonregistered members should be admitted to membership at all three levels, at the state and local levels only, or only at the local level. The predominant response indicated preference for leaving it to the board of directors at the ap-

*Table 20.* Answer to Question 13, according to answer to Question 12 (Type of membership to be given to nonregistered engineers).

| Question 13 Replies | All Respondents No. | All Respondents Per Cent | Answers to Question 12: Respondents recommending membership at national, state and local level No. | Respondents recommending membership at national, state and local level Per Cent | Respondents recommending membership at state and local level No. | Respondents recommending membership at state and local level Per Cent | Respondents recommending membership at local level only No. | Respondents recommending membership at local level only Per Cent |
|---|---|---|---|---|---|---|---|---|
| Limitation of membership | | | | | | | | |
| Members and fellows of founder societies | 411 | 9.8 | 54 | 7.0 | 139 | 7.2 | 218 | 14.6 |
| Any technical society member | 819 | 19.5 | 154 | 19.9 | 282 | 14.5 | 383 | 25.6 |
| Those qualified for registration | 2,112 | 50.2 | 429 | 55.5 | 1,065 | 54.9 | 618 | 41.3 |
| Any graduate | 758 | 18.0 | 115 | 14.9 | 401 | 20.7 | 242 | 16.2 |
| No Answer | 108 | 2.5 | 21 | 2.7 | 52 | 2.7 | 35 | 2.3 |
| Total | 4,208 | 100.0 | 773 | 100.0 | 1,939 | 100.0 | 1,496 | 100.0 |

propriate level to determine the equivalent qualifications to registration. A higher percentage of the respondents recommending admission at the local level only desired to limit it to members and fellows of either the founder societies or any technical society with ECPD equivalent grades of membership.

### If Admitted, What Grade of Membership?

In response to the grade of membership which such nonregistered people would hold, those willing to admit nonregistered members were split about evenly between the three alternatives offered with a slightly higher preference for associate members with voting privileges but not eligible to hold office. (See Table 21)

Reference to Table 22 will show an appreciable difference, however, in the grade and privileges for such members depending upon whether the respondent would admit them at the three levels, state and local level, or local level only. If to be admitted at all three levels, more than one-half of the respondents indicated such members should be full members with voting privileges, whereas, if to be admitted at the state and local levels only, more than one-half indicated they preferred them to be associate members with voting privileges but not eligible to hold office. Those recommending membership at the local level only were about evenly divided between associate members with voting privileges and associate members without vote, with about 1 in 10 voting for full membership with voting privileges.

### If Admitted, What Limitations?

With all respondents being asked to answer the question as to what limitations should be put on nonregistered membership if it were to be accepted at all three levels, more than 6 out of 10 felt the acceptance of such membership should be for a limited time only. Almost the same percentage felt there should be a time limit on how long an individual might remain as such a member. (See Table 23)

### Membership in Technical Societies

Table 24 shows the membership in founder societies and other technical societies of those responding to the questionnaire. Three out of 4 members of NSPE responding to this questionnaire are members of some technical society, with more than one-half of them being members of the founder societies.

*Table 21.* "Should such members be: (CHECK ONLY ONE ANSWER)."

| Replies | No. | Per Cent |
|---|---|---|
| 1. Full members with voting privileges | 1,178 | 28.0 |
| 2. Associate members with voting privileges, but not eligible to hold office | 1,646 | 39.1 |
| 3. Associate members without vote* | 1,286 | 30.6 |
| No Answer | 98 | 2.3 |
| Total | 4,208 | 100.0 |

* Only engineers who selected answers 1, 2, or 3 to question 12 (thereby accepting to some level of NSPE membership nonregistered engineers) were asked to answer this question.

*Table 22.* Answer to Question 14, according to answer to Question 12 (Type of membership to be given to nonregistered engineers).

| Question 14 (Voting privileges) Replies | All Respondents to Question 12 No. | All Respondents to Question 12 Per Cent | Answers to Question 12: Respondents recommending membership at national, state and local level No. | Respondents recommending membership at national, state and local level Per Cent | Respondents recommending membership at state and local levels No. | Respondents recommending membership at state and local levels Per Cent | Respondents recommending membership at local level No. | Respondents recommending membership at local level Per Cent |
|---|---|---|---|---|---|---|---|---|
| Full members with voting privileges | 1,178 | 28.0 | 805 | 53.8 | 154 | 19.9 | 219 | 11.3 |
| Associate members with voting privileges | 1,646 | 39.1 | 477 | 31.9 | 391 | 50.6 | 778 | 40.1 |
| Associate members without vote | 1,286 | 30.6 | 191 | 12.8 | 205 | 26.5 | 890 | 45.9 |
| No Answer | 98 | 2.3 | 23 | 1.5 | 23 | 3.0 | 52 | 2.7 |
| Total | 4,208 | 100.0 | 1,496 | 100.0 | 773 | 100.0 | 1,939 | 100.0 |

*Table 23.* "If nonregistered members were to be accepted at the national, state and local levels:"

| Replies | Should the period for acceptance be for a limited time only? No. | Per Cent | Should there be a time limit on how long an individual may remain a member? No. | Per Cent |
|---|---|---|---|---|
| Yes | 7,926 | 61.4 | 7,875 | 61.0 |
| No | 2,671 | 20.7 | 2,640 | 20.4 |
| No Opinion | 1,277 | 9.9 | 1,235 | 9.6 |
| No Answer | 1,038 | 8.0 | 1,162 | 9.0 |
| Total | 12,912 | 100.0 | 12,912 | 100.0 |

*Table 24.* "In what national technical societies do you hold membership?"

| Replies | No. | Per Cent† |
|---|---|---|
| ASCE—no additional membership(s) checked | 1,643 | 12.7 |
| ASCE—additional membership(s) checked | 989 | 7.8 |
| Total ASCE Members | 2,632 | 20.5 |
| AIME—no additional membership(s) checked | 196 | 1.5 |
| AIME—additional membership(s) checked | 150 | 1.2 |
| Total AIME Members | 346 | 2.7 |
| ASME—no additional membership(s) checked | 894 | 6.9 |
| ASME—additional membership(s) checked | 772 | 6.0 |
| Total ASME Members | 1,666 | 12.9 |
| AIEE—no additional membership(s) checked | 1,326 | 10.3 |
| AIEE—additional membership(s) checked | 644 | 5.0 |
| Total AIEE Members | 1,970 | 15.3 |
| AICHE—no additional membership(s) checked | 150 | 1.2 |
| AICHE—additional membership(s) checked | 179 | 1.4 |
| Total AICHE Members | 329 | 2.6 |
| One or more memberships in organization other than 5 major societies enumerated above | 2,282 | 17.7 |
| No membership in any national technical society | 3,291 | 25.5 |
| No Answer to Question 16 | 687 | 5.3 |
| Total | 13,203* | (102.5) |

* The number of answers tabulated here exceeds the number of respondents by 264, because some respondents belonged to more than one of the major societies. The most frequent overlap categories were as follows: ASME and AIEE, 120 dual memberships; ASCE and ASME, 60 dual memberships.

† Percentages computed on the basis of 12,912 (number of respondents).

The response to the questionnaire was tabulated by regions as a check to determine whether or not the geographical spread of the response was approximately the same as other surveys conducted by NSPE. The regional percentages were almost identical with those received in response to the salary survey conducted biennially by NSPE.

### Reaction of Members of other Societies

Because the current discussions of organization of the engineering profession, and particularly the Functional Plan, involve other societies as well as NSPE, the following presents recorder opinions of those who indicated membership in the founder societies and other technical societies. (See Table 25)

### Comments

The Committee emphasizes that these results are presented as the summary of the replies of those members of NSPE who expressed their opinion on the questions asked by returning their questionnaire. The Committee has not attempted to interpret the results or to draw any conclusions therefrom.

It is obvious from the response to the questionnaire that a great deal of work needs to be done by the local chapters and state socie-

*Table 25.* Answers to Questions 4–11, according to membership status in technical societies.

Question 4: How familiar are you with the Functional Plan proposed by the AIEE?

| | ASCE No. | % | ASME No. | % | AIEE No. | % | AIME No. | % | AICHE No. | % | Other Tech. Societies No. | % | None No. | % | NA to Q.16 No. | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Read in detail | 924 | 35.1 | 592 | 36.8 | 919 | 50.0 | 61 | 21.6 | 82 | 28.8 | 556 | 24.3 | 831 | 25.2 | 129 | 18.8 |
| 2. Heard reference | 829 | 31.5 | 531 | 33.0 | 640 | 34.9 | 77 | 27.3 | 90 | 31.6 | 793 | 34.7 | 1,125 | 34.2 | 234 | 34.1 |
| 3. Not familiar | 828 | 31.5 | 400 | 28.6 | 244 | 13.3 | 139 | 49.3 | 109 | 38.2 | 908 | 39.7 | 1,279 | 38.9 | 299 | 43.5 |
| 4. No answer | 51 | 1.9 | 27 | 1.6 | 34 | 1.8 | 5 | 1.8 | 4 | 1.4 | 31 | 1.3 | 56 | 1.7 | 25 | 3.6 |
| Total | 2,632 | 100.0 | 1,610 | 100.0 | 1,837 | 100.0 | 282 | 100.0 | 285 | 100.0 | 2,288 | 100.0 | 3,291 | 100.0 | 687 | 100.0 |

Question 5: How familiar are you with the Engineers Joint Council (EJC)?

| | ASCE No. | % | ASME No. | % | AIEE No. | % | AIME No. | % | AICHE No. | % | Other Tech. Societies No. | % | None No. | % | NA to Q.16 No. | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Have participated | 92 | 3.5 | 65 | 4.0 | 59 | 3.2 | 10 | 3.5 | 13 | 4.5 | 36 | 0.6 | 20 | 0.6 | 8 | 1.2 |
| 2. Very familiar | 1,257 | 47.8 | 839 | 52.1 | 854 | 46.5 | 88 | 31.2 | 131 | 46.0 | 815 | 35.6 | 952 | 28.9 | 209 | 30.4 |
| 3. Somewhat familiar | 996 | 37.8 | 552 | 34.3 | 711 | 38.7 | 122 | 43.3 | 107 | 37.5 | 954 | 41.7 | 1,397 | 42.5 | 243 | 35.4 |
| 4. Not familiar | 272 | 10.3 | 148 | 9.2 | 204 | 11.1 | 62 | 22.0 | 33 | 11.6 | 475 | 20.8 | 905 | 27.5 | 196 | 28.5 |
| 5. No answer | 15 | 0.6 | 6 | 0.4 | 9 | 0.5 | 0 | .... | 1 | 0.4 | 8 | 0.3 | 17 | 0.5 | 31 | 4.5 |
| Total | 2,632 | 100.0 | 1,610 | 100.0 | 1,837 | 100.0 | 282 | 100.0 | 285 | 100.0 | 2,288 | 100.0 | 3,291 | 100.0 | 687 | 100.0 |

Question 6: How familiar are you with the Engineers' Council for Professional Development (ECPD)?

| ANSWERS— | ASCE | | ASME | | AIEE | | AIME | | AICHE | | Other Tech. Societies | | None | | NA to Q.16 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Have participated | 115 | 4.4 | 117 | 7.3 | 80 | 4.4 | 22 | 7.8 | 17 | 6.0 | 45 | 2.0 | 18 | 0.5 | 14 | 2.0 |
| Very familiar | 1,029 | 39.1 | 750 | 46.6 | 768 | 41.8 | 98 | 34.8 | 121 | 42.5 | 713 | 31.2 | 823 | 25.0 | 177 | 25.8 |
| Somewhat familiar | 1,016 | 38.6 | 536 | 33.3 | 709 | 38.6 | 88 | 31.2 | 97 | 34.0 | 877 | 38.3 | 1,335 | 40.6 | 222 | 32.4 |
| Not familiar | 458 | 17.4 | 201 | 12.5 | 271 | 14.7 | 74 | 26.2 | 49 | 17.2 | 641 | 28.0 | 1,094 | 33.2 | 240 | 34.9 |
| No answer | 14 | 0.5 | 6 | 0.3 | 9 | 0.5 | 0 | ... | 1 | 0.3 | 12 | 0.5 | 21 | 0.7 | 34 | 4.9 |
| Total | 2,632 | 100.0 | 1,610 | 100.0 | 1,837 | 100.0 | 282 | 100.0 | 285 | 100.0 | 2,288 | 100.0 | 3,291 | 100.0 | 687 | 100.0 |

Question 7: Do you believe that a plan to have EJC coordinate technical matters, ECPD coordinate educational matters, and NSPE coordinate professional matters (the AIEE Functional Plan) would be a desirable first step in improving the organization of the engineering profession?

| ANSWERS— | ASCE | | ASME | | AIEE | | AIME | | AICHE | | Other Tech. Societies | | None | | NA to Q.16 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Yes | 2,001 | 76.0 | 1,328 | 82.5 | 1,633 | 88.9 | 200 | 70.9 | 230 | 80.7 | 1,709 | 74.7 | 2,475 | 75.2 | 438 | 63.8 |
| No | 324 | 12.3 | 117 | 7.3 | 84 | 4.6 | 24 | 8.5 | 23 | 8.1 | 203 | 8.9 | 234 | 7.1 | 58 | 8.4 |
| No opinion | 268 | 10.2 | 140 | 8.7 | 109 | 5.9 | 55 | 19.5 | 30 | 10.5 | 341 | 14.9 | 526 | 16.0 | 138 | 20.1 |
| No answer | 39 | 1.5 | 25 | 1.5 | 11 | 0.6 | 3 | 1.1 | 2 | 0.7 | 35 | 1.5 | 56 | 1.7 | 53 | 7.7 |
| Total | 2,632 | 100.0 | 1,610 | 100.0 | 1,837 | 100.0 | 282 | 100.0 | 285 | 100.0 | 2,288 | 100.0 | 3,291 | 100.0 | 687 | 100.0 |

Question 8: Do you feel a coordinating body of representatives from ECPD, EJC and NSPE would improve this proposal?

| ANSWERS— | ASCE | | ASME | | AIEE | | AIME | | AICHE | | Other Tech. Societies | | None | | NA to Q.16 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Yes | 1,855 | 70.5 | 1,162 | 72.2 | 1,231 | 67.0 | 202 | 71.6 | 189 | 66.3 | 1,605 | 70.1 | 2,294 | 69.7 | 417 | 60.7 |
| No | 328 | 12.5 | 197 | 12.2 | 321 | 17.5 | 23 | 8.2 | 40 | 14.0 | 235 | 10.3 | 321 | 9.8 | 58 | 8.4 |
| No opinion | 359 | 13.6 | 215 | 13.4 | 251 | 13.7 | 48 | 17.0 | 51 | 17.9 | 374 | 16.3 | 579 | 17.6 | 142 | 20.7 |
| No answer | 90 | 3.4 | 36 | 2.2 | 34 | 1.8 | 9 | 3.2 | 5 | 1.8 | 74 | 3.3 | 97 | 2.9 | 70 | 10.2 |
| Total | 2,632 | 100.0 | 1,610 | 100.0 | 1,837 | 100.0 | 282 | 100.0 | 285 | 100.0 | 2,288 | 100.0 | 3,291 | 100.0 | 687 | 100.0 |

Question 9: What do you think would be the most effective plan for the engineering profession at this time?

| | ASCE | | ASME | | AIEE | | AIME | | AICHE | | Other Tech. Societies | | None | | NA to Q.16 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| 1. Functional plan | 428 | 16.3 | 335 | 20.8 | 559 | 30.4 | 43 | 15.2 | 49 | 17.2 | 390 | 17.0 | 547 | 16.6 | 126 | 18.3 |
| 2. Funct. plan & coord. | 1,238 | 47.0 | 822 | 51.1 | 895 | 48.8 | 126 | 44.7 | 133 | 46.7 | 1,046 | 45.7 | 1,521 | 46.3 | 227 | 33.0 |
| 3. Federation | 641 | 24.4 | 284 | 17.6 | 208 | 11.3 | 72 | 25.5 | 64 | 22.5 | 464 | 20.3 | 673 | 20.4 | 146 | 21.3 |
| 4. No answer | 325 | 12.3 | 169 | 10.5 | 175 | 9.5 | 41 | 14.6 | 39 | 13.6 | 388 | 17.0 | 550 | 16.7 | 188 | 27.4 |
| Total | 2,632 | 100.0 | 1,610 | 100.0 | 1,837 | 100.0 | 282 | 100.0 | 285 | 100.0 | 2,288 | 100.0 | 3,291 | 100.0 | 687 | 100.0 |

Question 10: Do you feel NSPE should join EJC instead of supporting the Functional Plan?

| | ASCE | | ASME | | AIEE | | AIME | | AICHE | | Other Tech. Societies | | None | | NA to Q.16 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| 1. Yes | 491 | 18.7 | 212 | 13.2 | 135 | 7.4 | 44 | 15.6 | 35 | 12.3 | 275 | 12.0 | 331 | 10.1 | 88 | 12.8 |
| 2. No | 1,553 | 59.0 | 1,046 | 65.0 | 1,389 | 75.6 | 144 | 51.1 | 182 | 63.9 | 1,348 | 58.9 | 1,995 | 60.6 | 328 | 47.7 |
| 3. No opinion | 471 | 17.9 | 295 | 18.3 | 265 | 14.4 | 77 | 27.3 | 59 | 20.7 | 545 | 23.8 | 810 | 24.6 | 168 | 24.5 |
| 4. No answer | 117 | 4.4 | 57 | 3.5 | 48 | 2.6 | 17 | 6.0 | 9 | 3.1 | 120 | 5.3 | 155 | 4.7 | 103 | 15.0 |
| Total | 2,632 | 100.0 | 1,610 | 100.0 | 1,837 | 100.0 | 282 | 100.0 | 285 | 100.0 | 2,288 | 100.0 | 3,291 | 100.0 | 687 | 100.0 |

Question 11: Do you feel NSPE should be a member of ECPD?

| | ASCE | | ASME | | AIEE | | AIME | | AICHE | | Other Tech. Societies | | None | | NA to Q.16 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| 1. Yes | 846 | 32.1 | 548 | 34.0 | 470 | 25.6 | 93 | 33.0 | 85 | 29.8 | 624 | 27.3 | 738 | 22.4 | 152 | 22.1 |
| 2. No | 1,001 | 38.0 | 616 | 38.3 | 872 | 47.5 | 96 | 34.0 | 119 | 41.8 | 849 | 37.1 | 1,367 | 41.5 | 209 | 30.4 |
| 3. No opinion | 641 | 24.4 | 365 | 22.7 | 416 | 22.6 | 71 | 25.2 | 71 | 24.9 | 660 | 28.8 | 987 | 30.0 | 208 | 30.3 |
| 4. No answer | 144 | 5.5 | 81 | 5.0 | 79 | 4.3 | 22 | 7.8 | 10 | 3.5 | 155 | 6.8 | 199 | 6.1 | 118 | 17.2 |
| Total | 2,632 | 100.0 | 1,610 | 100.0 | 1,837 | 100.0 | 282 | 100.0 | 285 | 100.0 | 2,288 | 100.0 | 3,291 | 100.0 | 687 | 100.0 |

ties in acquainting the membership with the many aspects of the problem of the organization of the engineering profession. NSPE has expressed on many occasions the feeling that effective organization of the profession and answers to the many perplexing problems involved will be accomplished only to the degree that individual members of the profession inform themselves on the subject and are willing to support whatever solution may evolve with their time, their money, and their energies.

# New Literature

**REINFORCING BARS** – The Concrete Reinforcing Steel Institute has published a 12-page pamphlet listing American manufacturers of standard ASTM concrete reinforcing bars with photographic reproductions of bars showing mill marks identifying producer and location of mill. The pamphlet includes listing of applicable ASTM Specifications and chart showing standard size and weight data. All bars shown meet the requirements of Federal specifications, for use by all Federal agencies and the American Association of State Highway Officials.

*(Circle 14 in Readers' Service Dept.)*

**FLOOR LATH**—Engineers, architects, and contractors looking for helpful information about floor, veneer and stucco laths can find it in new literature offered by Pittsburgh Steel Products Division of Pittsburgh Steel Company. Steeltex Floor Lath is described in an 8-page brochure which shows claimed installation advantages and large, easy-to-read drawings. A special section shows how easily Steeltex Floor Lath can be adapted to virtually any building design, a safe loads table and specifications for installing Steeltex over steel and concrete joists. A separate 4-page folder describes features of Steeltex Masonry Veneer and Stucco Lath. Included are detailed specifications for using Steeltex in applying masonry veneer and stucco on wood or steel framing. Pittsburgh Steel's self-furring wire reinforcement, style C-216, also is covered.

*(Circle 15 in Readers' Service Dept.)*

**SAND TEST**—A new 4-page bulletin describing the sand equivalent test method is available from Soiltest, Inc. The sand equivalent test is a rapid field test which shows the relative proportion of detrimental fine dust or clay-like material in soils or fine aggregates, the bulletin explains. The test is used by engineers, contractors, and testing laboratories and is a standard procedure employed by many state highway departments. The new bulletin contains complete instructions for performing the test as well as photographs of actual procedures and apparatus needed for the test. The instructions include sections on sample preparation, test procedure, calculations and reporting, precautions, and operator qualifications.

*(Circle 16 in Readers' Service Dept.)*

**ESTIMATING**—To anyone in need of a quick estimate for supporting a deep excavation, a unique chart is now available from which the engineering data can be selected in thirty seconds. This new design and estimating tool—said to be a time-saver for engineers, architects, and contractors—is based on twenty-five years of specialized foundation experience and soil mechanics theory. The design is applicable and safe for deep excavations used for buildings, subways, sewers, highways and heavy construction projects. From the chart, the designer or estimator can select the size and spacing of all the structural components; vertical soldier beams, timber sheeting, horizontal wales and their supporting rakers. This data can be used for estimating the supporting structure for all soils which can be drained.

*(Circle 17 in Readers' Service Dept.)*

**SILICONES**—This recently published 12-page engineering guide explains how various physical forms of silicones contributed to reliability, miniaturization, modularization and environmental protection; increase serviceability over wide extremes of temperature, and aid value engineering. Well-illustrated, this new "materials handbook" contains engineering data and processing information on silicones. It details the important electrical and mechanical properties of the silicones most useful in electronics, and describes typical applications for silicones in every area of use—from satellites to seismographic instruments, from computers to servo motors.

*(Circle 18 in Readers' Service Dept.)*

**PHOTOCOPY PAPERS** – Bulletin 200—a 6-page gatefold brochure describing and listing user applications and prices for the company's diffusion transfer photocopy papers and films—has been prepared by Ampto, Inc. Included in the brochure are descriptions and prices for over twenty different types of papers and films, and the variety of uses for each type. Also briefly described are two of the most popular photocopiers in the Ampto line—the Ampto "Nine," for general office copying, and the Ampto "14," for the larger office or engineering department.

*(Circle 19 in Readers' Service Dept.)*

**EXTRUDED SHAPES**—The Metals Division of The H. M. Harper Company has published a booklet on extruded shapes which will serve as a handy guide for industrial designers and metallurgical engineers. Entitled "Harper Extruded Shapes—A New Concept," the 16-page booklet contains a wide variety of information, photographs and schematic drawings describing some unusual aspects of extruding steel and stainless steel. Included in the booklet are photos of thirty-eight different shapes the company has produced under the patented Ugine-Sejournet process. A standard design guide points out important factors to consider in designing the shapes. Standard tolerances and complete specifications on a wide range of metals regularly extruded, as well as a handy glossary of extruded shape terms, are also featured in the publication.

*(Circle 20 in Readers' Service Dept.)*

**SELECTION GUIDE**—An easy-to-use "Laminated Plastics Selection Guide" which combines a 12-page manual with a quick-reference chart of characteristics for twenty-one commonly-used laminated grades has been published by Taylor Fibre Company. The manual includes considerable handbook information for specifying and ordering laminated plastics. Included are: A thumbnail description of high-pressure laminates; the difference between minimum/maximum property values and average values; where and why laminate property values differ from the specification properties listed for metals, and step-by-step instructions on how to use the selection guide. Particularly useful is a discussion of common mistakes made in specifying and an "order check list" which shows information which should be given—in addition to standard ordering data—when purchasing laminates. The chart of laminate characteristics, which is suitable for pinning on a wall, assigns qualitative as well as quantitative values to the various laminates listed and simplifies selection further by grouping them under mechanical, electrical, or general purpose headings. Each laminate is rated as fair, good, or excellent for the property in question.

*(Circle 21 in Readers' Service Dept.)*

**CIRCUITRY**—"Modernair Moleculonics" is the title of a booklet by E. L. Holbrook, P.E., which is being made available to NSPE members. To promote the better understanding and correct application of pneumatic circuitry, the booklet discloses a few of the functions useful in circuitry that have been devised over the years. It is designed as a handy reference to help the engineer solve some of the perplexing control or automation problems which might confront him. The 54-page booklet contains a number of useful illustrations.

*(Circle 22 in Readers' Service Dept.)*

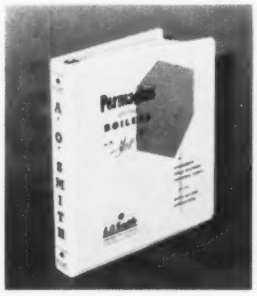
**ANTI-SLIP COATING**—An attractive, 4-color booklet describing Flintdek, an anti-slip coating, and its application in industrial, commercial and home areas is being issued by The Flintkote Company. Flintdek is not affected by oil or ordinary chemicals, according to the publication, and is easy to apply with either trowel or spray. It is available in five colors, and the treated area can be used for light traffic within forty-eight hours after application. It can be used in plants, buses and trucks, stadiums and swimming pools. On the back page is a brief description of latex concrete patch, a cement-like material which does not shrink and is used to repair holes, cracks and for leveling jobs in industrial areas and around the house.

*(Circle 23 in Readers' Service Dept.)*

**CONCRETE**—"Cam-Lock Forming System" is the title of an 8-page booklet offered by Gates & Sons, Inc. In detail, the booklet shows step-by-step application of the newly-patented concrete forming system. "How-to-do-it" information also covers five new products utilized with the system. Designed to handle all types of construction from light to extremely heavy, the Cam-Lock system easily integrates with other Gates systems and also embodies the use of flexible, inexpensive forming materials. The booklet gives examples of such claimed advantages as increased rigidity for highwall forming; greater simplicity, and lower materials cost.

*(Circle 24 in Readers' Service Dept.)*

**HEATING**—A "Hydronics Heating Manual," specially prepared for engineers and architects in a plastic covered loose leaf binder, is now available from the Permaglas Division, A. O.



Smith Corporation. Divided into three sections—residential, commercial and technical—the 150-page manual covers such subjects as basic hydronics principles, boiler sizing, modern system design, boiler replacement piping, boiler installation and operation data, controls, specifications and diagrams, pump data, performance charts, and graphs.

*(Circle 25 in Readers' Service Dept.)*

**PRODUCTS**—Madden Brass Products Company has released two new catalogs that include new products added to the Madden line. A 40-page industrial catalog, No. 160, introduces the extensive new line of Madden general purpose valves, drain cocks, tube working tools, brass pipe fittings and many others. The No. R460 refrigeration and air-conditioning catalog lists a complete line of flare tube fittings in the industry and, in addition to such items as hermetic port valves, color coded charging lines, driers, strainers, capillary tubing, automotive refrigerant dispensing kits, it also shows all of Madden's recently introduced products such as the new "tamper proof" tube piercing valve, small general purpose valves, testing outfits, thread sealer, etc.

*(Circle 26 in Readers' Service Dept.)*

**SYSTEMS**—A folder describing Whitney Blake Tuffline systems has recently been released. These heavy duty portable electric distribution systems are used by crews working in shipyards, mines, tunnels, passage ways, oil fields, heavy construction jobs, in boilers, on masts, power transmission towers and other places where power is essential though the need is temporary, according to the folder. This folder describes in detail the company's 3-pole system and illustrates many of the standard applications.

*(Circle 27 in Readers' Service Dept.)*

**X-RAY UNITS**—A 12-page booklet titled "Norelco Non-Destructive Testing Equipment," containing engineering facts and specifications for many X-ray test units for radiography and fluoroscopy, is available from Philips Electronic Instruments. Information covers the PG 100 lightweight portable, the PG 140 low-intermediate portable, the PG 200 high-intermediate portable, the MG 150 and MG 300 constant potential installations electronic fluoroscopy with image intensifier and closed-circuit TV, the PG 260 self-contained portable, and Portaspec—the Norelco portable X-ray Spectrometer. The booklet also gives data on auxiliary equipment such as tube-stands, including details on hydraulic tube carts, chain hoist operated jib cranes, pedestal and telescopic overhead mountings, as well as mobile chassis units. The brochure is well illustrated with photos and drawings.

*(Circle 28 in Readers' Service Dept.)*

**SIGNAL MANUAL**—An 88-page manual describing air and electric signal systems and listing specifications of horns, bells, buzzers, chimes and sirens has been published by Sperti Faraday, Inc. Included in the publication are sections on gravity drop and lamp type annunciators and accessory equipment, such as door openers and clocks. Selection of the proper type of signal for various background noise levels and work areas is illustrated by charts and diagrams.

*(Circle 29 in Readers' Service Dept.)*

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*These listings are informational only and are not an endorsement of the products, nor of the manufacturer's claims. To receive any of the new literature described in these columns, merely circle the item number in the Readers' Service Dept. and mail to AMERICAN ENGINEER.*

# Strictly Business

***Personalities*** . . . **Stephen Johnson, Jr.,** has been elected vice president of **Bendix-Westinghouse Automotive Air Brake Company,** Elyria, Ohio. . . . **Alfred M. Danzilli,** Pittsburgh, Pa., has retired after forty-seven years as a contracting engineer. . . . **C. D. Camden** has been elected chairman of the **Washington County (Ohio) Regional Planning Commission.** . . . **De Leuw, Cather & Company** has announced the opening of an office in Newark, N.J., in charge of **Robert B. Richards,** chief engineer. . . . **Earl T. Van Geem** has been named director of engineering for **J. H. Pomeroy & Co., Inc.,** San Francisco, Calif. . . . Recent personnel changes in the **Spencer Chemical Company,** Kansas City, Mo., include (with their new titles): **C. Y. Thomas,** chairman of the board; **John C. Denton,** president; **Byron M. Kern,** vice president of the Agricultural Chemicals Division, and **L. J. Rose,** senior project engineer. . . . **Ronald G. Davis** has been named a senior design engineer at **International Resistance Company,** Philadelphia, Pa. . . . **Russell K. Annis** has been appointed manager of engineering at Aurora Pump Division, **The New York Air Brake Company,** Aurora, Ill. . . . **R. F. Rocco** has been named planning commissioner of Garden Grove, Calif.

Mr. Johnson

**Edward J. Flaherty** has joined the engineering staff of **Tenney Engineering, Inc.,** Union, N.J. . . . The firm name of **Russ Henke Associates,** Elm Grove, Wis., has been changed to **Engineering Associates** with the addition of **E. Werych, Frank Hessler,** and **Ed Haker** to the staff. **Mr. Henke** has left the firm to become director of research for **Racine Hydraulics & Machinery, Inc.,** Racine, Wis. . . . The appointment of **Edward B. Freyfogle** as chief engineer of the **A. E. Staley Manufacturing Company,** Decatur, Ill., has been announced. . . . **E. B. Moore,** who joined **Vapor Heating Corporation's** Engineering Department in 1949 as director of research and has held various engineering posts with the Chicago, Ill., corporation, has been named publicity director. . . . **Altec Lansing Corporation,** Anaheim, Calif., has announced the appointments of **Alexis Badmaieff** as chief engineer, acoustics-transducers, and **William H. Johnson** as manager of the Engineering and Technical Information Department. . . . The election of **William B. Hudson, Jr.,** as vice president in charge of refinery engineering for **Arthur G. McKee and Company,** Cleveland, Ohio, has been announced.

Mr. Freyfogle

**Michael H. Barrett** has been appointed an associate of **Ketchum, Konkel and Hastings,** Consulting Engineers, Denver, Colo. . . . **Martin C. Hemsworth** has been appointed manager of engineering at **General Electric's** Small Aircraft Engine Department, Lynn, Mass. . . .The appointment of **A. H. Sonnenschein** as director of planning for **Polarad Electronics Corporation,** Long Island City, N.Y., has been announced by **Dr. D. L. Jaffe,** president. . . . The election of **Charles T. Abbott** as vice president-operations of the **New England Gas and Electric Association,** Cambridge, Mass., has been announced. . . . **Stein Hall & Company, Inc.,** New York, N.Y., have announced the appointment of **Irving Krushel** as manager of their newly created Engineering Department. . . . **Joseph A. Wiendl** has been named general manager of sales for **Ingersoll-Rand Company,** New York, N.Y. . . . **Rene R. Goosens** and **Walter W. Koskie** have been appointed to engineering positions with the Data Systems Division of **Telex, Inc.,** Minneapolis, Minn. . . . The appointment of **Harold G. Hencken** as director of the Engineering and Research Division of **American Felt Company,** New York, N.Y., has been announced.

Mr. Sonnenschein

**Joseph A. Rosenthal,** president of **Engineers Incorporated,** Newark, N.J., has announced the appointment of **C. Richard Treptow** as assistant vice president dealing with contract administration and client relations. . . . **Photocircuits Corporation,** Glen Cove, N.Y., has appointed **Ralph E. Wilbur** as resident applications engineer for the New England area. . . . **Christian H. Pedersen** has been appointed director of the mechanical Development Department at **Superior Tube Company,** Norristown, Pa. . . . The appointment of **Maurice G. Jewett** as engineering director of all chain divisions has been announced by **Chain Belt Company,** Milwaukee, Wis. . . . **The Portland Cement Association** has announced major changes in its field promotion organization, including the establishment of a new regional and a new district office. The States of Oklahoma, Arkansas, Louisiana, and Texas are being joined together in a new South Central Region with headquarters at Austin, while a district office is being established at Albuquerque to serve the State of New Mexico. **Thomas D. Shiels** has been named regional manager of the South Central Region, while **Bernard C. Smith** has been named the new district engineer for the office in New Mexico.

Mr. Pedersen

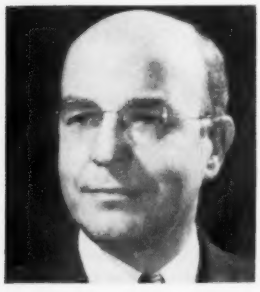
# Society Convenes in Boston For 26th Annual Meeting

The twenty-sixth annual meeting of the National Society will be held in Boston, Mass., this month—June 8-11—and the program includes many events of interest to the entire membership.

The meeting will officially get underway on Wednesday evening, June 8, and will be climaxed by the Saturday night banquet at which time the NSPE Award will be presented to James F. Fairman, senior vice president, Consolidated Edison Company of New York.

Senator Kenneth B. Keating will speak at the banquet on "The Engineer's Role in Politics."

Paul Endacott, president of Phillips Petroleum Company, will accept NSPE's first Industrial Professional Development Award on behalf of his firm at a luncheon on June 11.



Paul Endacott

Installation of 1960-61 NSPE officers is also scheduled for Saturday evening.

The Massachusetts SPE will present the "Bill Cunningham Press Award" jointly to *The Evening Gazette* of Worcester, Mass., and Paul L. Schultz, legislative journalist, for outstanding service to the engineering profession in the Commonwealth of Massachusetts. Mrs. Cunningham, widow of the late columnist, will make the presentation at the Thursday dinner, June 9.

Mr. Schultz is the first recipient of the award for his writings in support of the engineering profession in Massachusetts.

The four-day session at the Hotel Statler-Hilton will include the usual professional meetings as well as special functional section get-togethers and panel discussions.

"Engineering's Decade of Decision" has been selected as the meeting theme.

Many engineers have indicated that they intend to combine the session with a New England vacation. A varied social program has also been planned for those attending, according to Benjamin Mills, Jr., meeting chairman.

## *First Program Meeting Held by School Chapter*

The first program meeting of the Mississippi State University Chapter of the Mississippi Society of Professional Engineers was held recently.

Appearing on the program was Eugene T. Thomas, president of the Mississippi SPE; Boyce Biggers, president, Mississippi State Board of Registration for Professional Engineers, and Dean H. C. Simrall.

The Chapter was chartered on January 23, 1960, at the annual meeting of MSPE and had a student membership of 430 at the time of the program meeting. The Chapter has as its goal for the next year, "more members than the MSPE." This will require at least 650 members during its first full year of operation, and is the membership hoped for when the Chapter applies for its charter from NSPE during January, 1961. (See photo below.)

## *Mississippi Student Engineers Organize*

A student chapter of the Mississippi SPE has been organized at Mississippi State University (see story, top right). Attending the first meeting were l.-r.: Eugene T. Thomas, president of MSPE; Paul J. Robert, student chapter president; Harry C. Simrall, dean of the MSU School of Engineering and past MSPE president; Alexander Bell, student chapter vice president; Boyce H. Biggers, president of the State Board of Registration for Professional Engineers and past MSPE president; John H. Daniel, student chapter treasurer; J. E. Thomas, associate professor of electrical engineering and chairman of the Student Chapter Advisory Committee, and William M. Fondren, student chapter secretary.

## Thoughts on Professionalism...

By PAUL H. ROBBINS, P.E.

*NSPE Executive Director*

### The Public Image of Engineering

THE recent release of figures on freshmen enrollments in our engineering colleges by the Department of Health, Education and Welfare confirming that engineering freshmen enrollments had dropped for the second successive year has given more fuel to an ever-increasing concern as to why young people are not choosing engineering careers as extensively as they have in the past. These figures are further supplemented by reports indicating an increase in enrollments in basic science and mathematics, but the total enrollments in science, mathematics and engineering are still less than was the case in the fall of 1958. All this comes at a time, of course, when over-all college enrollments have increased and the number of high school graduates likewise is higher than ever before.

FROM the engineering educators to the users of engineering services, there is soul-searching as to the contributing factors to these statistics. In a recent meeting between one of the NSPE state societies and deans of engineering in the several colleges in that state, there was a strong expression of opinion that a major contributing factor was the public image of the engineer. It was noted, for example, that the most dominant factor in a young person's choice of a career is his family's attitude toward that career. Several studies were noted which indicated that while engineering as a profession was being accorded a recognition of contribution to human welfare, engineers as individuals seemed not to be associated with this concept. A recent doctoral study at the University of Southern California indicated that in a particular high school surveyed at considerable length, the high school student ranked the engineer at the bottom of a number of attributes they aspired to follow in the choice of their career.

THE public image of engineering is, of course, affected by many things. To further complicate the problem, the public image desired of the engineering profession varies with different groups that comprise the public. NSPE has identified well over thirty groups to which it addresses a portion of its public relations' activity. The Public Relations Committee of NSPE will present to the Board at the annual meeting an inventory of the many things the Society is doing to create an image of the engineering profession commensurate with the education of those who comprise its membership and the contribution made by engineering brainpower to the welfare of the nation.

THE biggest single activity directed to the general public is Engineers' Week; but the Society's programs aimed toward an increasing recognition of the value of engineering brainpower by industry, government, and others all contribute to a better appreciation of the role of the profession. Unfortunately, all of these organized activities, while contributing much to the public impression of the profession, must be supplemented by the impression those associated with members of the profession receive as the result of these associations. Public relations is not something that can be left either to a society or to some other members of the profession to accomplish. The most effective public relations is accomplished by the professional behavior of individuals, and most particularly their willingness to identify themselves as members of a profession.

### John T. West Retires as PSPE Executive Secretary

John T. West, Jr., prominent engineering executive, has retired as executive secretary of the Pennsylvania SPE.

With the Quaker State Society since 1949, Mr. West is a mechanical engineering graduate of the

John T. West, Jr.

Drexel Institute of Technology. From 1919 until 1944 he held various technical positions with the Pennsylvania Power & Light Company. From 1944 until 1949 he was with the Lehigh Engineering Company at Bethlehem, Pa., as a mechanical engineer.

Mr. West has been particularly active in the support and improvement of engineering education in the United States, and he was rewarded for this work in 1956 when Drexel conferred its alumni citation upon him.

He has served in many posts at the national level as well, most recently being a member of the NSPE Board of Directors.

### Melford E. Monsees Named President Missouri Chapter

Melford E. Monsees, office engineer of the Kansas City District, Corps of Engineers, was elected president of the Western Chapter, Missouri Society of Professional Engineers, at a recent Chapter meeting.

Other officers elected are: L. W. Bremser, vice president; Leo L. Cunningham, secretary; Harry J. Dunshee, Jr., treasurer; F. Gordon Clark, State director, and Eugene E. Goodwin, and Gilbert F. Hellimer, Chapter directors.

Mr. Monsees has held a number of offices in the Chapter, including a 3-year term as a director.

## *Million Dollar Building Planned by Ohio Society*

Plans for the construction of a new million dollar professional center just north of Columbus were announced by the Ohio Society of Professional Engineers at their eighty-second annual convention recently in Cincinnati.

To be constructed in the city of Worthington, the professional center will be a two story structure and will encompass 60,000 square feet of professional office and retail space.

Designed by the architectural and engineering firm of Freshwater and Harrison of Columbus, the design is the result of a recent statewide competition for plans for the new building. The design calls for a modern structure, yet compatible with the colonial architecture prevalent in the Worthington area. The building is planned to be a complete departure from usual shopping center type architecture.

Wayne E. Ault, president of the Ohio Society and E. C. Coldren, chairman of the headquarters group, announced that the building will feature a large auditorium for sales and promotional meetings, parking for approximately 400 automobiles, and attractive lobbies and reception areas.

The center will be constructed on a triangular shaped plot of ground now owned by the Ohio Society, located at the intersection of U. S. route 23 and the Worthington Galena Road. The new building will utilize modern buff colored brick, wide expanses of glass, a sheltered promenade along the entire front of the building, central heating and air conditioning and planting areas. Construction is expected to begin by late 1960 or early 1961.

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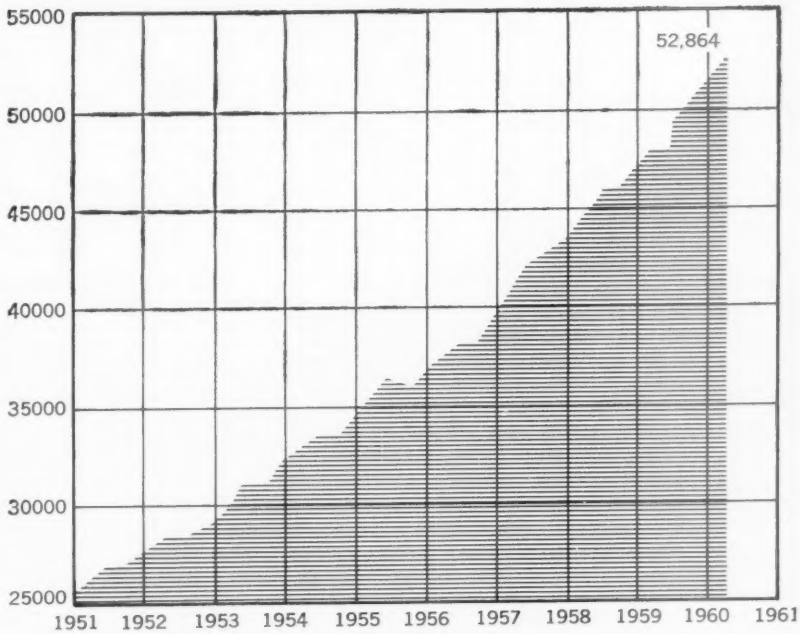
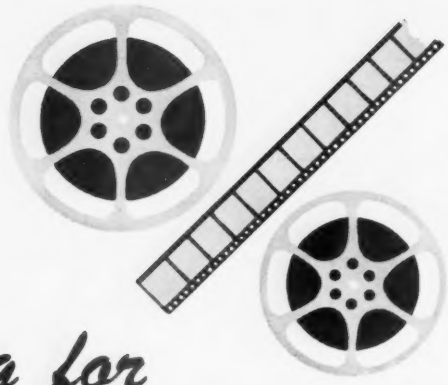



### *Oklahoma SPE Holds 25th Meeting*

**Top:** Elgin B. Robertson, P. E. and mayor pro tem of Dallas, keynotes the 25th anniversary convention of the Oklahoma SPE held in Oklahoma City in May. Shown with Mr. Robertson are, l.-r.: Herman Smith and Morrison Cunningham, convention co-chairmen; Mayor James H. Norick; Oklahoma SPE President R. F. Danner, and J. Ray Matlock, member, Oklahoma Board of Registration for Professional Engineers. **Right:** Past, present, and future—three of NSPE's presidents get together during the convention. They are, l.-r.: Clark Dunn, past president; Harold Mosher, current president, and Noah Hull, president-elect.

### *NSPE Presidents*

# NSPE Presents:



# "Building for Professional Growth"

**Here is a film covering the activities of the National Society of Professional Engineers at the chapter, state, and national levels. A milestone in the NSPE public relations program, "Building for Professional Growth" is a filmed presentation on the values and benefits of Society membership. Activities covered in the film include NSPE efforts in registration; research projects such as the Income and Salary Survey, the Professional Engineers Conference Board for Industry reports; legislative cooperation; National Engineers' Week, and other programs. Also included are scenes from actual chapter, state, and national level meetings.**

***"Building for Professional Growth" can be shown on any 16mm sound projector. Reservation requests should be made for three choices of dates. Notification of available date will be sent from NSPE headquarters immediately after each reservation request is received.***

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## to Remember

**Vermont Society of Professional Engineers**—Annual Meeting, June 4, 1960, Montpelier Tavern, Montpelier, Vermont.

**National Society of Professional Engineers**—Annual Meeting, June 8-11, 1960, Statler Hotel, Boston, Massachusetts.

**Massachusetts Society of Professional Engineers**—Annual Meeting, June 8-11, 1960, Statler Hotel, Boston, Massachusetts.

**Georgia Society of Professional Engineers**—Annual Meeting, June 16-18, 1960, Radium Springs Hotel, Albany, Georgia.

**Professional Engineers of North Carolina**—Annual Meeting, June 16-18, 1960, Grove Park Inn, Asheville, North Carolina.

**Delaware Society of Professional Engineers**—Annual Meeting, June 16-18, 1960, Wilmington, Delaware.

**South Carolina Society of Professional Engineers**—Annual Meeting, June 17-18, 1960, Cleveland Hotel, Spartanburg, South Carolina.

**Missouri Society of Professional Engineers**—Annual Meeting, June 24-25, 1960, Daniel Boone Hotel, Columbia, Missouri.

**Indiana Society of Professional Engineers**—Annual Meeting, June 24-25, 1960, French Lick Sheraton, French Lick, Indiana.

**Arizona Society of Professional Engineers**—Annual Meeting, June 25, 1960, Tucson, Arizona.

**National Society of Professional Engineers**—Fall Meeting, October 19-21, 1960, Statler-Hilton Hotel, Denver, Colorado.

By Mrs. Garvin H. Dyer, Chairman of the Ladies Auxiliary Advisory Committee.

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**The questionnaires mailed out** to the auxiliary presidents by NSPE are being returned at a satisfactory rate. We sincerely hope that we hear from every auxiliary. All the information contained will be summarized and as much as possible will be included in *Engineers Wives*. Of particular interest is the many ways the various auxiliaries have of raising money, and the increasing interest and variety of projects.

**The president of the Central** Chapter Auxiliary of Arizona, Mrs. Jefferson D. Bullock, and two members, Mrs. Murry Head and Mrs. Charles Wheeler, met recently with a group of engineers' wives from Tucson, Ariz., and assisted them in organizing an auxiliary to the Tucson Chapter. Mrs. B. J. Shell was elected as its president.

**Two other chapters in the far** west have new auxiliaries—Seattle and Spokane, Wash. Mrs. Edward W. Kimbard was elected president of the Seattle group, while Mrs. James Latenser was elected president in Spokane.

**The Central Chapter of New** York also have a new auxiliary. Mrs. Victor E. Hall of Syracuse was elected president.

**When the Bartlesville, Okla.,** Auxiliary had a joint meeting with the chapter the women proved very resourceful in decorating the tables with miniature trucks, oil derricks and ivy, and were able to return the $25 to the chapter which had been allowed for decorations. A satire on a typical women's club executive committee meeting, written by Argyle Briggs and enacted


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by the Auxiliary's Executive Committee, proved to be hilarious.

**The Tulsa, Okla., Auxiliary is** holding a series of five benefit bridge parties, proceeds to go to the scholarship fund. They report an active year, and participated in Engineers' Week by placing posters in the shopping centers and on school bulletin boards.

**Sixty dollars was raised at a** spaghetti dinner when the Wichita Mountain Chapter Auxiliary entertained their husbands. The money was turned over to the men to use for Engineers' Week expenses.

## ETHICS

*(Continued from page 38)*

cisions, but after the decision has been made, Rule 14 does prohibit the inclusion of special requirements which may be met by only one company out of many, unless such limitation is required by the special function of the structure or project. This right has been upheld by the Ohio Supreme Court in a case reported in the AMERICAN ENGINEER, July, 1953, page 26.

Questions 3 and 4—These questions are intimately related. If the first is improper, then the second must be of the same classification. There is clearly a conflict of interest implied, if not actual, in this relationship, and, as such, it is definitely forbidden by Section 15 unless the engineer had previously received the approval of both parties. Under the latter circumstance, it would be theoretically proper but still undesirable. This type of operation suggests the possibility of slighting the work done on the original design, with no comparable reduction in fee; and the receipt of payment from the fabricator for the detailed design is directly forbidden under Section 16. It gives rise also to the possibility of a situation developing where the fixing of final responsibility for a mistake or for unsatisfactory results would be additionally difficult if the engineer had represented the fabricator on the unsatisfactory item. On the

other hand, if his contract with his client terminates before construction starts, or if his services have been discontinued at the option of the owner, he would then be free to perform such work for a contractor or subcontractor who might desire his services.

Question 5—It is general practice for the engineer to approve materials and shop drawings prepared for use by the fabricator on a project which he has designed. The proper arrangement, however, is for this to be part of his duty to his client covered by a portion of the fee to be received from the client. Receipt of payment from the fabricator would place it in the same category as Questions 3 and 4, and would be improper for the same reasons.

**Conclusion:**

To Questions 1 and 2—The use of standard specifications by reference and the provision for the preparation and submission of shop drawings by the contractor are well established customs in the construction industry and do not conflict with the Canons of Ethics and Rules of Professional Conduct.

To Questions 3 and 4—It is not in keeping with the Canons and Rules for an engineer to solicit or to execute work for a contractor, a manufacturer, or a supplier for items to be used in a project which he has designed, and on which he is still a representative of the owner.

To Question 5—It is proper for a consulting engineer to approve materials and shop drawings of items and materials to be incorporated in a project which he has designed so long as his payment for such services comes from his client, the owner of the project, or when such services are covered by his contract with his client.

Approved by the Board of Ethical Review at their meeting in Washington, D. C., December 10, 1959.

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## CHANNEL

*(Continued from page 36)*

Plans for a bridge have been in the picture also. Only this spring, Compagnie Française d'Enterprises France, Dorman Long of England and Merritt-Chapman and Scott of the U. S. submitted plans for a bridge which would carry both rail and road traffic.

The bridge would have a central five-lane highway, forty-nine feet wide; two rail tracks, one on each side of the highway, and an overhanging sidewalk thirteen feet wide on each side for cycle traffic. The over-all width would be about 110 feet with a height of over 200 feet. The bridge would be about twenty-five miles long with 142 piers, the deepest reaching down to about 165 feet. There would be a 740-foot span between pier centers except for two pairs of wider navigation openings which would be large enough to accommodate all shipping.

If the project is to be a tunnel, it is still to be decided whether to construct it by means of an immersed tube or by boring through the chalk formation. The immersed tube would probably be constructed in prefabricated units and placed in trenches dredged in the sea bed. This is similar to the method used successfully in such projects as the Baltimore Harbor Tunnel.

The immersed tube would eliminate any geological risks, and would make it possible to construct a tunnel with a wider diameter. But, the big problem in this method is the fact that the dredging of the trench would have to be carried out from floating equipment which would be exposed to the heavy seas and bad weather of the Straits of Dover. Geological surveys carried out by the Channel Study Group established the feasibility of boring a tunnel through the Lower Chalk formation which ranges in thickness between 213 and 262 feet under the seabed. Modern boring machines would be able to cover about 1,475 feet a month in this formation.

The present plans were revived in 1957 by Frank Davidson, a New York attorney, and Arnaud de Vitry, a French-American technologist, who formed a company

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known as Technical Studies, Inc. They were later joined by the Suez Canal Company after the Suez Canal was seized by Nasser. The Channel Tunnel Study Group is now composed of The Channel Tunnel Company Limited, in which the British Transport Commission is a shareholder; the Société Concessionaire Du Chemin de Fér Sous Marin Entre La France Et L'Angleterre in which the Société Nationale des Chemins de Fér is the main shareholder; the Compangnie Financiere de Suez, and the Technical Studies, Inc.

Whether this group will be any more successful than its predecessors probably will be known within the next six to eight months. If the French and English governments give the green light, one of the biggest engineering jobs in years will be launched.

It will serve as a fitting monument to the imagination of engineers everywhere.—**End.**

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## *Annual Meeting of Wisconsin Society*

The Wisconsin SPE recently held its annual meeting at Green Bay and among the highlights of the session was a "Citation Award Luncheon" in honor of the physical sciences and mathematics teachers of Wisconsin high schools. In the left photo, Miss Edith Johnson, a mathematics teacher from La Crosse, receives a citation from A. B. Drought, co-chairman of the WSPE Education Committee. Looking on at the far left is Franklin A. Wittwer, another award winner, and

Prof. Thomas Higgins, Department of Electrical Engineering, University of Wisconsin, and WSPE State director. Shown at the opening general assembly in photo at right are, l.-r.: Prof. Higgins; NSPE Executive Director Paul H. Robbins; G. R. Coates, attorney and WSPE counsel; W. A. Piper, secretary Wisconsin Registration Board of Architects and Professional Engineers, and G. A. Schueler, attorney, law examiner, Wisconsin Registration Board.

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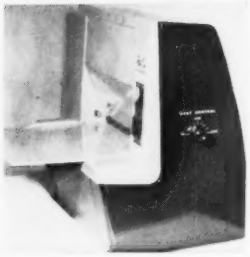
# Progress in Products

## HEAT CONTROL — Item 30



A convenient new control will permit users of the APECO "Ply-On," the plastic laminating machine made by American Photocopy Equipment Company, to dial the exact degree of heat required for any paper from lightest tissue to heavy card stock. The new dial at the side of the machine adjusts heat automatically, which assures a professional laminating job, according to the manufacturer.

## AEROSOL SPRAY — Item 34

High visibility fluorescent enamel for emergency safety marking may now be applied quickly with a convenient new type finger-tip spray dispenser, the Du Pont Finishes Division has announced. Known as the "Jet-Pak," the aerosol sprayer consists of three elements—a can of propellent, an unbreakable plastic spray head, and a glass jar which holds the thinned "Pyralux" fluorescent enamel. It is said to be ideal for quick stenciling of signs on white cardboard.

## TIME-SAVER — Item 31

The engineering department of Dean Products, Inc., has come up with an "engineering short-cut." Here is an accurate method for determining the square feet of Panelcoil heating surface required to heat water to a given temperature, in a given time. It doesn't matter whether you're heating an open tank, or a piece of processing or plant equipment, using this simple method you will be able to select the correct feet of Panelcoil to do the job, the firm claims. The only factors required are: gallons to be heated; operating temperature; minimum time; "U" heat transfer value, and operating steam pressure.

## SOIL STABILIZING — Item 35

American Cyanamid Company has announced "an entirely new concept of soil stabilization and grouting"—the development of a chemical that turns water into a stiff continuous gel in a controlled period of time. Known as AM-9 Chemical Grout, it was designed for application by means of a patented process in the mining and construction industries to prevent various types of water seepage. The new product, seven years in development and field testing, is available as a dry white powder, and is applied in a nonviscous solution which will penetrate any mass through which water flows.

## METAL PAN — Item 32

Accesso Ceiling Products, Inc., has developed a new type of durable metal acoustical ceiling which is quickly installed, easily accessible to above-ceiling areas, and is claimed to be competitive in cost with the popular incombustible mineral tiles. With 1½" Furring Channels installed on four-foot centers, Accesso channels are clipped in place on two-foot centers, and the 12" x 24" Accesso Metal Pan units hung from the channel in a manner to conceal all suspension members.

## STICKING MATERIAL — Item 36

Dozens of everyday mounting, holding, anchoring or posting tasks are made easier with a new plastic substance called Delkote Solid Tak. It sticks indefinitely to any clean, dry surface; yet it can be removed in seconds and reused as often as desired. Unlike sticky tapes, tacks or pins, it rolls away neatly without tearing or leaving gummy residue to clean off or unsightly holes to patch, according to the manufacturer.

## LATEX MODIFIED MORTAR — Item 33

Latexes—high polymer "plastic" particles dispersed in water—have been designed specifically to upgrade the bond strength, tensile and flexural strength, compressive strength, and chemical and solvent resistance of portland cement mortar. Thin ½" resurfacing of concrete, wood, and even metal, with latex modified mortar is entirely practicable. The latex modified mortars are appreciably less in cost than epoxy-type mortars, while approaching the same excellent property range, it is claimed. Interior applications are proved; exterior applications—particularly in bridge deck restoration—are under evaluation.

## INK REMOVER — Item 37

Alvin has introduced an ink remover that for the first time really completely removes ink. It's the modern formula, X-A Ink Remover and is designed to thoroughly eradicate all traces of India ink, regular ink, pencil and ballpoint drawings, stamp pad ink, carbon. It is specially formulated for use on all types of tracing paper, vellums, cloths and plastic mediums. The remover will not warp tracing paper nor damage plastic foil. It dries quickly; redrawing or copy printed over erased areas can be done almost immediately. An excellent cleaner for drawing instruments, X-A Ink Remover comes in durable plastic container, with handy needle spout with cover.

**This feature describes new products of general interest to professional engineers. For further information, circle the item number in the Readers' Service Dept. and mail to AMERICAN ENGINEER.**

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